

The Mining And Metallurgical Journal

VOL. XIX, NO. 7

LOS ANGELES, CAL.,

July 1, 1898,

SAN FRANCISCO, CAL.

Price 15 Cents

Jessop's STEEL

The Best
FOR

Mining Drills,
Tools, Etc.

I. WILLARD BEAM,

29 Main Street
SAN FRANCISCO, CAL.

THE EDWARD P. ALLIS COMPANY

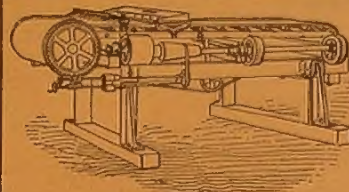
MANUFACTURERS OF

Mining, Milling and Smelting Machinery

Crushers, Concentrators, Pumps, Compressors, Hoists, Boilers,
Reliance Crushing Rolls, Reynolds Corliss Engines, &c.

Send for Catalogue.

Milwaukee, Wis.



Perfect Concentration

Can be Done on an IMPROVED
GATES VANNER. No one has ever
built a better.

Crushers, Rolls, Cyanide and Chlorination Specialties; Gravity Stamps, Steam
Stamps, Smelters. Our Catalogue literature is considered very complete

Gates Iron Works, Dept. 2,

650 Elston Ave., Chicago

THE
ROESSLER & HASSLACHER Chemical Co.

100 William St., New York

CYANIDE

Peroxide of Sodium

Hyposulphite of Soda

Chloride of Lime

Sulphide of Iron



Trade Mark

And Other Chemicals for Mining Purposes.

Joseph Dixon Grueble Co.

MINERS, IMPORTERS AND MANUFACTURERS

GRAPHITE & PLUMBAGO

JERSEY CITY, N. J.

RETORTS, CRUCIBLES, GRAPHITE LUBRICANTS, BELT DRESSING,
GRAPHITE PAINTS, LEAD PENCILS, AND GRAPHITE
PRODUCTS OF ALL KINDS.

Send for Production Catalogue.

Graphite Makes the Best Lubricant
and Best Paint.

ADAMANTINE SHOES & DIES

AND

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll
Shells and Crusher Plates.

These castings are extensively used in all the Mining
States and Territories of North and South America. Guar-
anteed to prove better and cheaper than any others. Orders
solicited subject to above conditions. When ordering send
sketch with exact dimensions. Send for Illustrated Circular.

CHROME STEEL WORKS,

Kent Ave. & Keap St., - BROOKLYN, N. Y.



Stamp Dies

Stamp Dies



Stamp Cam

The Pelton Water Wheel

Affords the Most Economical and Reliable Power for Mining,
Electric and all other purposes.

9000 WHEELS NOW RUNNING

PELTON WATER WHEEL CO., 121 Main St., San Francisco, Cal.

PARKE & LACY COMPANY

21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

LICENSEE FOR THE MANUFACTURE AND SALE OF

The Huntington Centrifugal Roller Quartz Mill

THE HUNTINGTON MILL is so well and
favorably known among mining men throughout
the world that any description of it would seem
superfluous. They are in use in the United
States, Canada, Mexico, Central and South
America, Australia, China, Japan, and South
Africa. In fact, wherever mines exist, and have
given the best satisfaction of all quartz crushing
mills.



The construction of this mill has lately been much improved and we claim it to be the

CHEAPEST, MOST EFFICIENT, SIMPLEST, AND MOST DUR-
ABLE MILL UPON THE MARKET.

← CATALOGUE UPON APPLICATION →

Refractory Ores

Successfully treated by the
PORTER ELECTRICAL PROCESS

Address

The Porter Gold and Silver
Extraction Company

505 BULLARD BLOCK.

LOS ANGELES, CAL.

Consolidated Kansas City Smelting & Refining Co.

BUYERS OF ALL CLASSES OF

BULLION, MATTE, ORE & MILL PRODUCTS, GOLD & SILVER BARS

Smelting Works { Leadville, Colorado.
El Paso, Texas.
Argentine, Kansas.
REFINERIES ARGENTINE-KANSAS.

FOLLOWING CODES USED: At Argentine, Kansas.
A. B. C.
Mores & Wells
and Bedford McNeill's.

Ore Purchasing Agencies

{ Spokane, Wash. Salt Lake, Utah.
Leadville, Colorado. Denver, Colorado.
El Paso, Texas. Argentine, Kansas.
Cripple Creek, Colorado

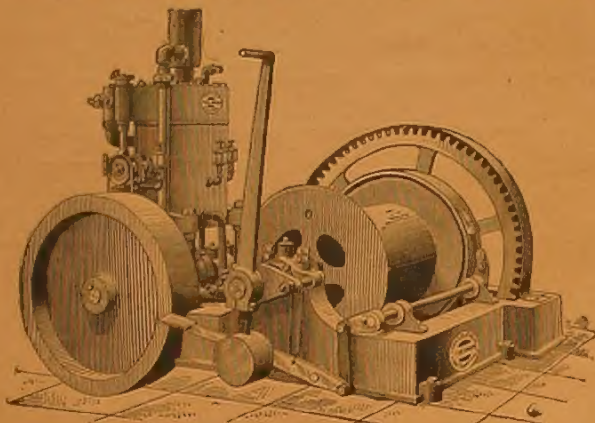
California Vigorit Powder Co.

Manufacturers of

Dynamite High Explosives and "Vigorit Low" Blasting Powder

OFFICE: 208 California Street,
San Francisco, Cal.WORKS: Point Isabel,
Contra Costa Co. Cal.

"Union" Hoist



Union Gas or Oil Engine and Hoist Combined, on strong, iron base.

No Fire No Steam No Boiler No Danger
TEN YEARS' EXPERIENCE. Two Thousand Engines in Use.

Started instantly. Compact, strong, simple, efficient, economical. Perfectly governed, so that oil is used only in proportion to the work done. No expense when idle.

Particularly Adapted to Mining in Localities Where
Fuel and Water are Expensive.

Built in the following sizes:—1 H.P., 4 H.P., 6 H.P., 8 H.P., 10 H.P., 15 H.P.,
20 H.P., 30 H.P., 40 H.P.

Send for Catalogue and state what H. P. required.

Union Gas Engine Co.,

301 Howard Street, San Francisco, Cal.

YUKON BOATS AND SLEDS

Stern Wheel Boats, 25 ft. to 200 ft. in length. Light draught.
Shipped—knocked down—and set up ready to run. Send for circulars and prices.

SAN FRANCISCO LAUNCH CO. Cor. of North Point and Stockton Sts. San Francisco, Cal.

The only Genuine ALBANY GREASE
has this TRADE MARK on every pack-
age. Look out for Yellow Label.



ALBANY GREASE

Lubricates Everything
Especially Adapted to Mining and Milling Machinery.

—MADE ONLY BY—

Adam Cook's Sons

313 WEST ST., NEW YORK.

BRANCHES:

55 S. Canal Street, Chicago, Ill.

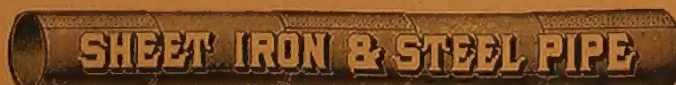
34 Fremont St., San Francisco, Cal.

ALBANY DYNAMO & ALBANY CYLINDER OILS

If you are not using these Oils give them a trial
at once, and we know the result. You will want
no other.

FRANCIS SMITH & CO.,

—MANUFACTURERS OF—



MINING PIPE ALL SIZES

Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all Sizes.

Iron cut, punched and formed, or making pipe on ground where required. All kinds of Tools
supplied for making Pipe. Estimates given when required. Are prepared for coating all sizes of
Pipes with Asphaltum.

100 Beale Street

San Francisco, Cal.

Eclipse Sectional Rainbow Gasket

5/8 in. for pipe
unions
1/2 in. for hand-
holes
5/8 in. for man-
holes
3/4 in. for extra
large man-holes



FOR
UNION
STAND HOLES
AND
MAN HOLES

**Peerless Rubber
Mfg Co.** 16 Warren St.
New York City

18-24 Woodward Avenue, Detroit, Mich.
Dunham, Carrigan & Hayden Co., San Francisco, Cal.



202-210 S. Water Street, Chicago, Ill.

T. & B.

STEEL MINING PIPE

— FOR —

HYDRAULIC, PLACER AND QUARTZ MINING

Riveted up complete or Cut and Punched to be
Riveted at the mine.

Well Pipe, Galvanized Air Pipe, Wrought and Cast Iron Pipe. Iron
Tanks of all kinds. Water Supply Material. General
Sheet Iron Works.

Correspondence Invited

Send for prices

THOMSON & BOYLE CO.

306-318 Requesena St.,

Los Angeles, Cal.

WILLIAM H. EMANUEL,

REPRESENTING

RAND DRILL COMPANY,
THE EDW. P. ALLIS CO.,

Air Drills and Compressors
General Mining, Milling and Smelting
Machinery and Reynolds Corliss Engine
Wire Rope and Bleichert Tramways
General Service and Mining Pumps

TRENTON IRON CO.,

HENRY R. WORTHINGTON,
ROBIN'S BELT CONVEYOR

DENVER

COLORADO

RICHARD L. COLBURN,

Stock and
Mining Broker

Member of
Salt Lake Stock and
Mining Exchange

SALT LAKE CITY,
UTAH.

JUST PUBLISHED

SECOND EDITION, REVISED AND MUCH
ENLARGED.

Gas, Gasoline and Oil Engines

BY GARDNER D. HIBOOK, M. E.

The only American book on the subject. 324
pages, 8vo, illustrated with 270 handsome engrav-
ings. Price \$2.50. Full of general information
about the new and popular motive power, its
economy and ease of management. Also chap-
ters on Horseless Vehicles, Electric Lighting,
Marine Propulsion, etc.

Special circular and catalogue on
request. Address

NORMAN W. HENLEY & CO.

132 Nassau Street, New York

TRIPP METALLIC PACKING

FOR
PISTON RODS

Mining Trade
Solicited

WM. B. MERRILL & CO.,

SOLE MANUFACTURERS

Office and Factory, 295 Congress Street
BOSTON, MASSACHUSETTS

W. N. JEHU.

Assay Office and Chemical Laboratory

Rooms 46 and 47 Montgomery Bldg.

628 MONTGOMERY ST., SAN FRANCISCO, CAL.

Ore assays, analyses of minerals, metals
and their alloys, etc. Lessons given in assaying

WOODBURY CONCENTRATOR



No. 121 First St., - San Francisco

McDearmon & Co.

Asbestos Boiler & Steam Pipe Coverings
Asbestos Cement for Boilers, drums, Heaters,
Etc. Special facilities for supplying
the mining trade.

Pacific Coast Agent for E. W. John's Co's Asbestos
Sectional Coverings.

622 Sacramento Street, - San Francisco, Cal.

MACHINERY

STAMP MILLS, Marine and Stationary
ENGINES and BOILERS, Saw Mills and all
kinds of new and second hand machinery.

Send for Catalogue

WASHINGTON MACHINERY DEPOT
TACOMA, WASHINGTON

J. W. Paxson Co.

FOUNDRY

Facings, Supplies, Equipments

COMPLETE OUTFITS

* Philadelphia, Pennsylvania

ALPHABETICAL INDEX TO ADVERTISERS

A		B		C		D		E		F		G		H		I		J		K		L		M		N		O		P		Q		R		S		T		U		V		W		Y					
Abbott, W. O.	23	Baker & Adamson Chemical Co.	18	Caldwell Bros.	21	Dame, W. E.	18	Imperial Chemical Co.	22	Jackson Drill and Manufacturing Co., The	26	Lambert Hoisting Engine Co.	32	National Iron Works	6	Ohlandt & Co., N.	29	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22	Machinery and Electrical Co.	29	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
Acta Powder Co.	4	Baker & Co.	22	Cal Bellows Mfg Co.	24	Daniel, C. A.	28	Incorporated Mines Paying Dividends	20	Jeffrey Manufacturing Co.	26	Leffel & Co., James	22	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	San Francisco Launch Co.	29	Mathison & Co.	23	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	San Francisco Launch Co.	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
Agramonte, C. H. M.	7	Baker & Hamilton	22	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
Alinsworth, Wm.	20	Baird & Co., Henry Carey	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
Allen, E. C., Edward P.	1	Bear & Co., A. J.	17	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
Altender & Sons, Theo.	21	Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
American Diamond Rock Drill Co.	4	Belmont, J. H.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
American Zinc Lead Co.	19	Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
Aubury, L. H.	19	Belmont, J. H.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	McDermott & Co.	2	New Haven Mfg Co.	25	Oregon Railroad and Navigation Co.	29	Pacific Tank Co.	25	Reed, Edward B.	25	Ready Rock Asphalt Roofing Co.	24	S. P. Pioneer Screen Works	29	Mathison & Co.	23	National Pipe Bending Co.	26	Ohlandt & Co., N.	29	Pacific Mining Machinery Co.	21	Queen & Co.	24	Reed, John T.	21	Santa Fe Route	22
		Bell, Newton M.	21	California Wire Works	29	Davis Iron Works Co., F. M.	17	Ingersoll, Sergeant Drill Co.	19	Jeffrey P. M.	2	Lexow, Theo.	30	National Pipe Bending Co.	26	Oregon Railroad and Navigation Co.	29	Reed, Edward																																	

Crude Platinum Purchased.

To Identify Crude Platinum when found, send 75c for Sample in glass, packed in a strong box. We purchase or refine anything containing Platinum.

BAKER & COMPANY.

NEW YORK OFFICE: 131 Liberty Street. NEWARK, NEW JERSEY

John Wigmore and Sons Co.,

GENERAL MINING SUPPLIES

HEAVY HARDWARE IRON AND STEEL

AGENTS FOR

John A. Roebling's Sons Company s

WIRE CABLES

Giant Powder

117 to 123 S. Los Angeles St.,

LOS ANGELES, CALIFORNIA

DICKMAN & MACKENZIE

MINING ENGINEERS,
ASSAYERS AND CHEMISTS

1224 Rookery Bldg., Chicago Box 77, El Paso, Texas

Orders by mail or express promptly attended to. Mining properties examined.

F. M. JEFFERY.

MINING LAWYER

212 Wilcox Bldg., Los Angeles, Cal.

Five years in Cripple Creek, Colo.

Weber Gasoline Mine and Mill Pumps

ALL SIZES.

FOR ALL DUTIES.

Economy and Efficiency

Guaranteed.

Address, stating capacity

and conditions,

WEBER GAS AND

GASOLINE ENGINE CO.

434 W. W. Boulevard,



KANSAS CITY, MO.

CHAS. C. MOORE & CO.

ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS. GREEN'S ECONOMIZERS,
McINTOSH & SEYMOUR ENGINES, WHEELER CONDENSERS,
HAMILTON CORLISS ENGINES, BARNARD-WHEELER COOLING TOWERS,
N. Y. SAFETY AUTOMATIC ENGINES, HOPKES LIVE STEAM-PURIFIERS
GOUBERT FEED WATER HEATERS, EDMISTON FEED WATER FILTERS,
STRATTON STEAM SEPARATORS, BUNDY STEAM TRAPS,
SNOW STEAM PUMPS, SPENCER DAMPER REGULATORS,
QUIMBY SCREW PUMPS, HYATT ROLLER BEARINGS.

Watch this Space for description of the above Machinery.

Send for Catalogue and Full Information.


19 First Street, San Francisco, Cal.

GOODYEAR'S RUBBER GOODS
— FOR —
Miners and Mining
CATHETER RUBBER, Crack Proof Boots, White Rubber Coats, Oil Clothing
BELTING, PACKING AND HOSE
573, 575, 579 Market Street,
SAN FRANCISCO, CAL. 73 and 75 First St.
PORTLAND, OREGON

Diamond - Pointed Core Drills
AMERICAN DIAMOND ROCK DRILL CO.
120 Liberty St., New York.
P. O. Box 1442.
SETS OF ORES
Scientifically and Practically Arranged
Invaluable for reference in the work of the prospector, engineer or chemist. Illustrated Catalogue Free
Price of Collections \$3.50 and Upwards
Specimens Purchased
Of Ores or Fine Crystallizations
Correspondence Solicited
DR. A. E. FOOTE, 1317 Arch Street
Philadelphia, Pa.
ESTABLISHED 1876

JENA Trade Mark
SCHOTT & CO. JENA
Normal Glass
BEST GLASS FOR Laboratory use
CHEMICALS AND CHEMICAL APPARATUS
ASSAY BALANCES
Finest Ever Made
Specialties:—Analytical Portable Balances, Porcelainware, Platinum goods, Crucibles, Cupels, Scoffers, Muffles, Furnaces, C. P. Acids, etc.
Everything Necessary for Assayers
Elmer & Amend,
3d Ave. Cor of 18th St. New York

Advertise in The Journal
J. HOWARD WILSON
Assayer and Chemist
A Specialty Made of Umpire Work.
306 Santa Fe Ave., Pueblo, Colo.
The Standard Authority
One Volume, Small Quarto, 313 Pages, 72 Illustrations, \$5.00.
A Practical Treatise on Hydraulic Mining in California
By AGO. J. BOWIE, JR., Mining Engineer
CONTENTS
The Records of Gold Washing, General Topography and Geology of California; The Distribution of Gold and Deposits, and the Value of Different Strata; Amount of Workable Gravel Remaining in California; Preliminary Investigations; Reservoirs and Dams; Measurement of Flowing Water; Ditches and Flumes; Various Mechanical Appliances; Blasting Gravel Banks; Tunnels and Sluices; Tailings and Dump; Washing or Hydraulic Mining; Distribution of Gold in Sluices; Loss of Gold and Quicksilver; Duty of the Miner's Inch; Statistics of the Costs of Working, and the Yield of Gravel.
D. VAN NOSTRAND COMPANY, Publishers
23 Murray and 27 Warren Sts., NEW YORK
Copies sent by mail or express on receipt of price

CONSOLIDATED PIPE COMPANY,
IRON AND STEEL WATER PIPE A SPECIALTY

73-889 STEPHENSON AVENUE, LOS ANGELES, CAL.
A. C. HARPER, Proprietor.
Telephone Main 420 Post Office Box 867

THE COLORADO and CALIFORNIA Mineral Developing Co.
433-4-5 STIMSON BLOCK, LOS ANGELES, CAL.
Prospecting, Developing of Mines, Mine Operators, Locating, Buying and Selling of Mines a Specialty, Financial Agents for Eastern Capitalists.
GAIL BORDEN, President
GAY W. BROWN, Vice-President
J. K. HAWK, Secretary
CAPITAL STOCK, \$200,000
Correspondence Solicited

ELECTRICAL FUZES
BLASTING MACHINES
LEADING WIRE
CONNECTING WIRE

THE AETNA POWDER CO.
188 MADISON STREET
CHICAGO - ILL.
Send for our illustrated pamphlet

A NEW MORTAR

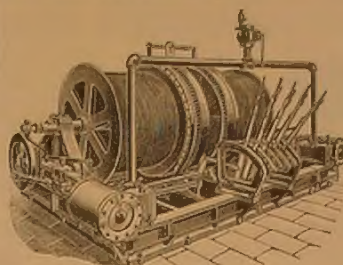
That is a crusher and pulverizer combined.



Weight 110 lbs.; Diameter 10 1/2 in.; Height 3 1/2 in.
Fills a long-felt want. Send for descriptive circular. Crusher Pulverizer No. 1, \$25.00.
J. E. Surman & Co., 103 E. 14th St., New York

Lidgerwood Hoisting Engines

Built to gauge on the Duplicate
Part System. Quick Delivery Assured.



HENSHAW, BULKLEY & CO., Agents, San Francisco.

New York

Mine Hoists, CABLEWAYS

Conveying Devices, for Mining, Quarrying,
Logging, Dam Construction, &c.

Electric Hoists and Appliances

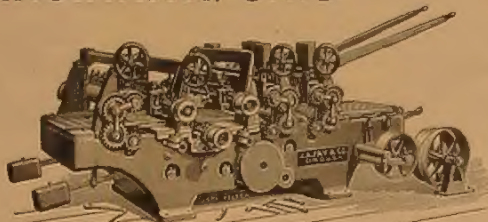
Lidgerwood Mfg. Co.

J. A. FAY & EGAN CO.

CINCINNATI, OHIO

Wood Working Machinery

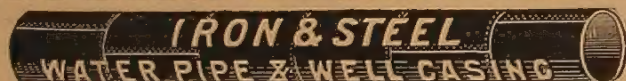
— FOR —



Box Factories, Planing Mills, Sash, Door & Blind Factories
Carriage, Wagon and Agricultural Shops.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal

THE NATIONAL IRON WORKS



Rivets, Boilers, Tanks, and Sheet Steel or Iron Work of every description.

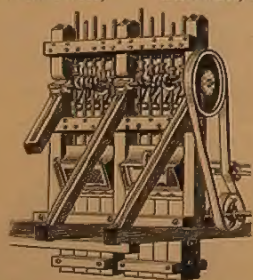
MANUFACTURER OF THE

National Steel Ore Car

Repairing of All kinds Promptly Attended to.
PORTLAND, OREGON

The F. M. Davis Iron Works Co.

Office and Works 723 to 743
LARIMER STREET,
Corner 8th Street, DENVER, COL.



Our Stamp Mills from 500 lbs. to 1,000 lbs.
Stamps are strictly up to date. Furnished with
Steel or Semi-Steel wearing parts, heavy mortars
of late improved design, with or without steel
linings, as desired, and the Davis Patent Self-
Tightening Camps of High-Grade Open-Hearth
steel, and High-Grade Forged-Steel Cam Shafts
and Stems.

They are designed with great care by engineers
familiar with the best previous practice and
knowing just what is wanted to render satis-
factory service.

Send for Catalogue and Prices.

OUR New Book

ESSAYS UPON

Boiler Incrustation and Corrosion.
Boiler Explosions, The History of
Natural Water Contamination.

BY GEO. W. LORD, is now ready

We will send this interesting little book free of
cost to

EVERY SUPERINTENDENT
OR ENGINEER

Who will state his occupation. By whom em-
ployed. Total Boiler capacity. What Scale pre-
ventive he is using. The cost of the article. And
how long the supply will last. Address

Geo. W. Lord, Philadelphia
Pa.

J. B. TOMLINSON, M. E.

Prescott, Arizona,

MINING PROPERTIES EXAMINED, AP-
PROVED AND REPORTED UPON

Supervision taken of the development of pros-
pects and the operation of mines.

S. S. MACHINERY CO.

Buy, Sell and Trade in All Kinds of SECOND-HAND
Mining and Wood Working Machinery.

CORRESPONDENCE SOLICITED.

OFFICE: 1529 Lawrence
WORKS: 8th and Market

DENVER, COLORADO

TELEPHONE: Office, 120
Works, 1284

ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process
adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary
losses, etc.

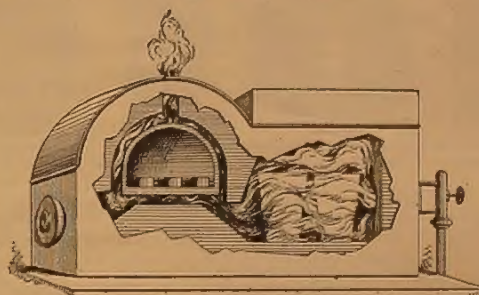
RICKETTS & BANKS,

Metallurgists & Chemists

No. 104 JOHN STREET,

NEW YORK CITY

LONERGAN & CALKINS' Combined Melting and Muffle Furnace,



Both furnaces always hot and ready for use. One burner suffices. A saving of one-half in fuel
used. Compact and convenient to transport to and from mines and on prospecting trips. Furnace
revolves on a pivot. After making one melt with burner inserted in melting end reverse furnace,
insert burner in muffle end and you are prepared to continually melt and cupel without further dis-
turbance. A special feature of this is the oxidizing bonnet (not shown in illustration) by
which a continuous flow of fresh air, controlled by a damper, is passed through the muffle.

LONERGAN & CALKINS,

Gold and Silver Refiners,
Assayers and Bullion Buyers.

127 West First Street,

LOS ANGELES, CAL.

THE TRUAX PATENT IMPROVED

AUTOMATIC ORE CARS

Manufactured by

CHAS. B. BOOTHE & Co.

126-128
SOUTH LOS ANGELES ST.

LOS ANGELES, CAL.



Pat. Jan. 2, 1892, Pat. Aug. 27, 1895.

Send for our Catalogue and Prices

Bullock's Diamond Prospecting Core Drills

These are the only Machines which will give absolutely accurate records of
borings. Fifteen styles and sizes. Operated by hand, horse, steam, air or
electricity.

Monarch Rock Drills

Any style of mounting. Simple, compact, economical. Operated by air or steam
Hoisting and Haulage Machinery to fill any requirements.

M. C. BULLOCK MFC. CO.,

1178 West Lake Street,

CHICAGO, ILLINOIS

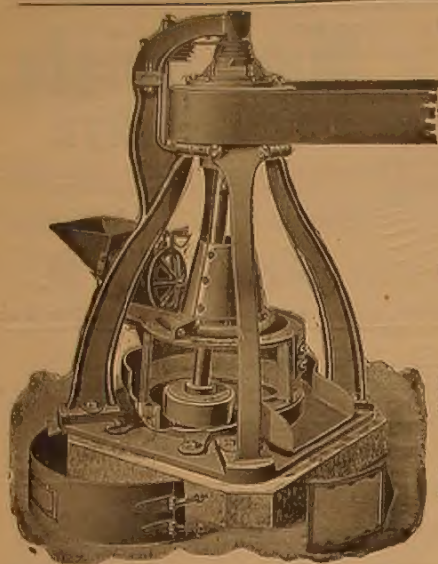
* SCHOOL OF *

Practical Mining, Civil, Mechanical,
Electrical Engineering, Metallurgy,
Cyanide Process, &c.
Surveying, Architecture, Drawing and Assaying.
933 MARKET ST. SAN FRANCISCO, CAL.
OPEN ALL YEAR
A. VAN DER NAILLEN, President.
Assaying of Ores, \$25; Bullion and Chlorination
Assay, \$35; Blowpipe Assay \$50. Full Course
of Assaying, \$50. Established 1864.
Send for Circular.

PETER HEER,

222-234 E. Washington St., CHICAGO
Manufacturers of Highest Class

Engineering and Mining Instruments,
T-Squares, Triangles, Scales, Etc. Repairs care-
fully and promptly executed. Drafting Sup-
plies of all kinds. Catalogue on application.



THE GRIFFIN MILL

The only Perfect Pulverizer Working both Wet or Dry Process

NO JOURNALS IN PULVERIZING CHAMBER.

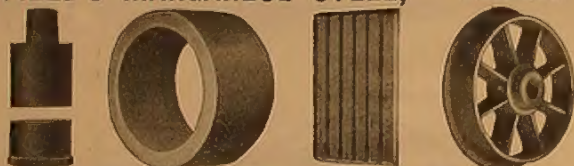
Delivers a finished product. Will pulverize 1 to 2 tons per hour on Portland Cement, Quartz or ores depending on hardness of material and firmness of product.

— Manufactured and Sold by —

Bradley Pulverizer Co.,

92 STATE STREET,
Boston, Mass.

HADFIELD'S MANGANESE STEEL, HARD, TOUGH.



Best Metal known for Stamp Shoes and Dies, Roll Shells, Crusher Plates and Side Liners. Toggles and Toggle Bearings, Gyratory Cones and Concaves or Liners, Mine Car Wheels, Coal Crushing Rolls, Etc., Etc.

TAYLOR IRON AND STEEL CO.,

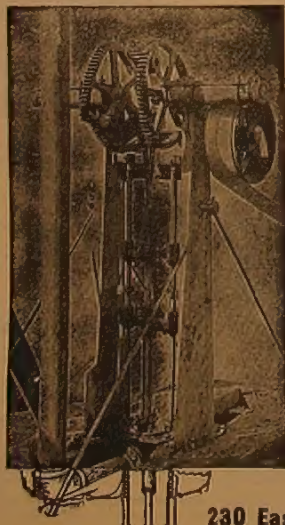
Sole Licensees in America under Hadfield System and Patents.

High Bridge, N. J., U. S. A.

KEUFFEL & ESSER CO.
NEW YORK.
127 FULTON AND 42 ANN STS.
Branches: 111 Madison St., Chicago; 708 Locust Street, St. Louis, Missouri
Drawing Materials and Surveying Instruments
largest and best assorted stock in America. All requisites for field, mine, and draughting room. We have made a study of this line, and our goods are warranted to be as nearly perfect as it is possible to make them. Prices reasonable. Write for catalogue.

Agent FULTON POWER PUMPS

With Capacities up to 30,000 gallons per hour.
Made by A. T. Ames, of Galt, Cal.



Fred. F. Hunt, E. M.

Chemist and Assayer

Weighing, Sampling and Assaying all Mineral Products
Specialties: Lead, Bismuth and Unpure Assays
Samples by Mail or Express
77 Pine Street, New York City

LAMBERT

Gas, Gasoline and
Distillate Engines

TANKS, PIPE
and WATER
SUPPLY
GOODS



Call on or Address,

S. J. SMITH,

230 East Fourth Street,

LOS ANGELES, CAL.



Head and Shoulders Above 'em all!

If you want to get the miners' trade just ask him for it, through the columns of

The **Mining and
Metallurgical
Journal**

which as a business getter is head and shoulders above 'em all.

Offices:

Stimson Block, Los Angeles, Cal.
64-65 Merchants' Exchange,
San Francisco, Cal.



KEYSTONE LUBRICATING GREASE

The only grease adapted to all temperatures. It will not splash or drip like oil.



Our goods are not for sale by the Jobbing trade. If you want the genuine Keystone Grease it can only be obtained from us.

A full set of brass cups furnished FREE on first purchase

Especially adapted for Air Compressors and all kinds of Machinery in connection with Mines, Mills and Smelters. Send for trial sample and Cup Free of Charge.

Keystone Lubricating Co. 20th Allegheny Ave.
Philadelphia, Pa.



The Harrington & King Perforating Co.

127 N. Union St., Chicago Ill.

Eastern Office, 284 Pearl St., New York.

ENTERED AT THE POST OFFICE AT LOS ANGELES, CALIFORNIA
AS SECOND CLASS MAIL MATTER.

Vol. XIX. July 1 No. 7

E. W. EDELSTEN, Editor.

JOHN STEWART, *Special Contributor*

ULRICH KNOCH, Publisher

OFFICES { Slimson Block, Los Angeles, Cal.
64-65 Merchants Exchange, San Francisco, Cal.

SUBSCRIPTION PRICE:

For United States, Mexico and Canada.....		\$2.50 per annum
For all other countries in the postal union.....		3.50 per annum
		1.75 six months

ISSUED SEMI-MONTHLY

ADVERTISING RATES FURNISHED ON APPLICATION.

OBTAINING A PATENT.

Sulphur, in the native but impure condition, is one of the non-metallic mineral products of the Western States which the present war with Spain has brought into importance, as the price has advanced from \$20 a ton to \$35 and \$45 a ton in New York for brimstone. The attention of prospectors is called to this fact, and in one instance has been taken advantage of to supply the local demand for sulphuric acid, for the manufacture of artificial fertilizers in Los Angeles. A deposit of native sulphur, located on the old Pio Pico Rancho, two miles west of Whittier on the road to Los Angeles, and about twelve miles from this city, is being opened. The deposit is found at the foot of a hill close to the road and east of the reservoir at Aliso Canyon, in rocks of cretaceous age. The present extent of the exposure shows on the surface for a distance of 25 by 100 feet so far as exposed. As other deposits of sulphur have been found in the California coast range, they may be operated at present rates to compete with the imported article from Japan and the Gulf of Mexico. Although the demand on this coast is small, it is highly desirable that manufacturers of oil and acid for fertilizers should do all in their power to purchase supplies at home, as every new deposit opened means increased trade in the district, and, indirectly to themselves, with a possible supply at lower cost.

generally supposed that the patentee article, process or new invention has a long and an easy means of gaining recognition on account of the successes made by fortunate inventors. The general public is not aware of the uncertainty and tedium which an applicant for patent has to experience before his papers are considered by the patent office in the first stage. In an extent is this the case, that after a patent has been applied for, it generally takes from six to nine months before it can be considered. It is not therefore wise for the inventor to place his invention on the market until he has had his invention passed upon by the patent office for patent. If he does so, and a patent is applied for," that does not protect him from infringement by makers of the article produced with slight changes. If he has not obtained his patent, and cannot obtain it, he is unable to stop such infringement of his invention. On this account, the most necessary reform is one in which our inventive geniuses of this country can originate a new patent process. At present time is a new patent process necessary to complete reorganizations of our slow business-like system of conducting the patent business in the United States patent office. As the last thing any government is known to do is to effect a reform in the patent service for the benefit of suffering inventors, and as we desire it for many of our intelligent readers and patrons, we are compelled to call the attention of the over-worked officials of this branch of public service to the valuable use the inventors of this country can put their invention to, in perfecting a new process or method for aiding and expediting the slow process of patenting an invention. It is too short in most instances, but long for a man to wait until after he has received the benefit of his invention, that his invention is protected by law. As to this matter, the great inventor, A. Edison, has had some experience. He can apply to electrify the system of patenting, and thereby become the inventor of the age.

INTERNATIONAL MINING CONGRESS.

The parties advocating the government ownership of minerals, and those who are in favor of individual ownership have both to acknowledge that the leasing of minerals is a plan for working them which works well under both systems. The difference between the two plans of operating is that under government control the leasing is done by areas or mines, and may be classed as a wholesale branch, while under the individual proprietor mines and works are leased as a whole, and often subleases are let to the workmen. In the eastern states the system is largely practiced of leasing to miners as well as more recently in the west has the tributing system of the Cornish miner come to be in favor both with the employer and the miner. It allows of individual energy and ability to work, the fullest chance for expansion and gain. In contrast with the company account, or days' wages plan, where leasing is possible will the

As already noted in these columns, the first session of the International Mining Congress will assemble in Salt Lake City, Utah, on the 6th, 7th, 8th and 9th of this month. This organization is the result of the Inter-

national Gold Mining Convention, held in Denver last year at similar dates.

"The objects of the Convention are to secure such national legislation as may be calculated to promote the business interests and development of the resources of the mining industry in North and South America; to bring together mining men and investors; to increase reciprocal trade among them; to discuss such questions as are naturally suggested by its objects; to cultivate acquaintance, fraternal feeling and hearty co-operation among various mining, commercial and labor bodies represented; and especially to take under advisement the importance of the creation, by Congress, of a department to be known as the Department of Mines and Mining, thus securing a Cabinet Officer that represents an interest which affects more than one-third of the people of the United States."

This JOURNAL has on former occasions advocated the union of North and South American countries, in the interests of the large silver mining industry of the American continent, which produces almost all the silver of the world, with the single exception of Australia, as the only solution of the problem for securing the just value of a metal of exchange in the form of money, which the poor of all nations cannot do without. If these countries make treaties to prohibit the export of silver in bars, or other form, except as coin, minted by each country at a fixed ratio, then will the people of Europe and Asia be forced to buy our silver at coin value, to supply their own demand. This all important and far-reaching subject comes strictly within the province of the International Mining Congress.

MINES AND QUARRIES.

The underground operation of extracting the metallic minerals is generally conducted by sinking shafts, and driving tunnels and levels, under cover of the surface ground or back of the vein, and as depth is attained so does the expense of mining increase. This feature in mining has only one exception, as in the case where a mine is located on a high mountain side, and the mining is conducted by overhand stoping, and where pumping is not necessary. In this instance, the cost of mining only increases with the length of haul along the levels of the mine. The increase of cost as depth is gained is always considered the natural result of mining work, under all other circumstances than that mentioned. The mining of ores is a destructive proceeding, as its object is to break up the mineral, so as to admit of handling.

In conducting quarrying operations or open work, which is the common manner of extracting the non-metallic minerals, the chief expense is at the inception of the work, as surface soil and top rock, or decomposed material has to be removed. In consequence of this, the operation of quarrying is almost always conducted with less expense as depth is reached. The deeper the work goes, the more solid and free from climatic change is the material to be quarried found, and consequently of more value. Quarrying operations of the destructive class are the simplest and require less skill, while that of the constructive order are the class which require the material to be kept whole, which is the most difficult, as in quarrying slate rock, marble and building stone, and are best operated with large capital and on an extensive

scale. In both kinds of quarrying, the expense decreases with depth, and furnishes a striking difference between the operation of mines. In a southern and mild climate this feature is more noticeable than in the frozen northern regions. Hence it is that the quarrying of many non-metallic minerals, offers profits in excess of mining the precious metals, when the all-important question of marketing the product is of easy solution.

THE NEW REVENUE BOND BILL.

This bill has been passed by both branches of Congress and has received the signature of the President. It is a law of tripartite features: one enlarges internal taxes, another provides for the issuance and sale of bonds to produce the means for carrying on the war with Spain and the third relates to the money question, by authorizing the issuance of \$150,000,000 of treasury certificates, to be put out as emergencies demand, and to be taken up at the convenience of the treasury, and also requires that the silver bullion in the vaults of the treasury shall be coined at least at the rate of \$1,500,000 per month.

The collection of a larger revenue, and the imposition of increased excises will have some influence unfavorable to the development of industries, and will be something of a restraint upon commerce. It does not effect a change or modification of the financial system. The issuance of the treasury certificates will increase the circulating volume. It leaves standing the ruling of the treasury department that all our paper money is redeemable with gold coin, except the silver certificates, which are specifically made redeemable with silver coin.

The bonds authorized are not to be sold to a syndicate of bankers, unless there is failure to sell them by subscription and as a popular loan. The law contemplates their sale in small denominations, that they may be widely distributed, and perhaps so used as to some extent perform the office of a circulating medium. Whether or not they can be so disposed of will shortly be determined. Bonds sold through syndicates are usually concentrated in the hands of few holders. If the popular loan plan succeeds in this instance, it will be an entering wedge for the policy of having our own people become the holders of the public securities.

The silver coinage proposition is a slight concession to the silver sentiment of the country, and if the law is faithfully executed, in time the treasury will be relieved from the storage of a large quantity of bullion. It will take some time, however, to coin it, if no more than \$18,000,000 are coined annually, whether more shall be coined or not is left to the discretion of the secretary of the treasury. It is known that Mr. Gage is a believer in a limited volume of money, and that our circulating medium should be confined to gold coin, and national bank paper redeemable with gold coin, with the quantity of subsidiary silver coins that convenience may require. Hence it is to be presumed that he will not coin any more silver bullion than is compulsory by law. The silver bullion on hand comprises seigniorage to the extent of \$42,000,000, and were it all as promptly coined as possible, that sum would be added to our volume of circulating medium.

The bonds authorized are to be made payable in coin according to existing law and previous practices, and not in gold coin as Mr. Gage would have done.

The law will be irksome to our younger population who have not been accustomed to sweeping excises and to a horde of tax gatherers. To the older class, it will be a reminder of the civil war, and of the five or more succeeding years. To them it will revive an unpleasant reminiscence.

The measure is a compromise. The senate and house held widely divergent views, and for a time it seemed as if both sides would be stubborn, but the presence of war forced both sides to make concessions. There was a necessity for more money to conduct the war, a sum that cannot be immediately produced from taxation alone. One side wanted bonds as well as additional taxes, and the other was quite willing to grant more taxes, but in lieu of bonds wanted an issue of greenbacks, and all the silver bullion in the hands of the government speedily coined, that the country might have the benefit of the seigniorage which, as before stated, amounts to \$42,000,000. It now sleeps in the treasury, doing no good to the government or the people.

THE ELECTRO-CHEMICAL AND ELECTRO METALLURGICAL INDUSTRIES OF EUROPE.*

The Electrolytic Tin Industry.

The extraction of tin from its ores by electrolytic methods has not yet been attempted on an industrial scale, though several patents have been filed relating to apparatus and processes for effecting such extraction. The electrolytic tin industry is at present confined to the recovery of the tin from tin scrap, and to the production of pure tin from raw tin by an electrolytic refining process, similar to that used for copper.

The recovery of tin from tin scrap is one of those operations for which electrolysis seems to have been specially designed, and one would expect in these modern days, when the profitable utilization of city refuse is considered a subject of primary importance, that any feasible process would meet with enormous success. This is however not the case. Many processes have been patented for the electrolytic treatment of tin scrap, and some of these are now working with successful results in Germany and France, but the number of such works is much more limited than one would have expected, and the difficulty of obtaining large quantities of the raw material at reasonable rates hampers the growth of the industry. Tin scrap contains from 3 to 9 per cent of tin, the average amount of tin present being 5 per cent. Thus in order to obtain one ton of tin from this scrap, even supposing the whole of the tin is recovered, 20 tons of scrap must be dealt with, and where the collection and delivery of the scrap at the electrolytic works costs \$6 to \$7 per ton (as in some cases) the recovery process is burdened with a very heavy charge. In some localities, however, the scrap can be collected and delivered for treatment at one-tenth of this cost, and in such places, and especially in localities where other manufactures lead to the production of great quantities of clippings of tin plate, the electrolytic recovery processes have every chance of success. Three processes are at work, and these may now receive brief description.

In Germany, Borchers states that several firms are recovering tin from tin scrap by

* Electricity.

electrolytic methods, though he does not specify names or localities. It is interesting to note that much scrap is being shipped to Europe from Baltimore, and it is probable that part of the supply of these German works is drawn from this source. The firm of "Goldschmidt u. Cie. of Essen a. d. Ruhr" was the first in Germany to attempt the recovery of tin on a commercial scale.

No details have been published concerning the process used in the majority of these works, but it is most probably that patented by Gutensohn and further improved by Siemens & Halske, while in the case of one works in Berlin the apparatus and process patented by Smith is stated to be used. The principle of both Gutensohn's and Smith's process is the same. The tin scrap is packed into baskets made of wooden laths holding each about 140 lbs., and is used as anode in a cell containing dilute sulphuric acid as the electrolyte, and plates of tinned copper as the cathode. The acid of course attacks the iron as well as the tin of the tin scrap, but only the latter metal is deposited at the cathode, and when the acid has become saturated with iron, it is run off and worked up for ferric sulphate. According to Smith, and Siemens & Halske, an E.M.F. of 1.9 volts suffices to provide the necessary current density; and a current efficiency of 50 per cent is obtained. The remainder of the current is lost, owing to the concurrent action upon the iron of the anode material.

In France the recovery of tin from tin scrap is effected by a process in which caustic soda solution is used as the electrolyte. The advantage of this solution is that it acts only on the tin, and the iron remains unattacked in the baskets containing the anode material.

The disadvantages are that heat must be applied, otherwise only oxygen will be produced at the anode on passage of the current, and that 10 per cent of tin remains in the electrolyte as sodium stannate, and cannot be deposited at the cathode by the current. The solution used in this process is stated to be a 10 per cent caustic soda solution, containing a definite proportion of common salt.

In England, Smith's process is stated by Ahrens to be at work, and in 1896 a company was registered for operating the process patented by Claus. In this process, tin scrap or any alloy of tin is used as an anode material in an electrolyte containing alkaline sulphides. Sodium sulpho-stannate is formed, or the corresponding potassium or ammonium salt, and the deposition of tin from this solution is easily effected. The iron remains undissolved, and as the electrolyte requires heating during the electrolysis, the process closely resembles that in which caustic soda is used as the solvent.

The writer has written to Mr. Claus to inquire how this company is progressing, and learns that the plans are now completed for the commencement of operations upon an industrial scale, and that the process will shortly be at work.

The only factory known to the writer in which raw tin is refined electrolytically is that of Messrs. T. Bolton & Sons, Churnet Valley, Staffordshire, England. The raw tin is cast into plates suitable for use as anodes, and is placed in electrolyzing vats containing dilute sulphuric acid. A high current density is employed, and a very rough crystalline deposit of tin obtained at the cathode. The crystals can easily be detached, and are washed, dried and melted in order to prepare ingots of pure tin, which are used to coat

with tin some of the classes of telegraph wire prepared by this firm at their wire-drawing works in the same neighborhood.

The cost of the energy required to produce one ton of tin by these processes can easily be calculated by means of the electro-chemical equivalent for tin, and the data already given. Take an E.M.F. of 1.9 volts (for the sulphostannate solution this would probably be reduced) and a current efficiency of 50 per cent, the E.H.P. requisite to produce one metric ton tin per 24 hours will be:

$$1,000 \times 1,000 \times 1.9 \times 100$$

$$= 193.8.$$

$$.000309 \times 60 \times 60 \times 24 \times 735 \times 50$$

Taking the cost of the E.H.P. hour at \$.002, the cost of the electrical energy necessary to produce a metric ton of tin from tin scrap or tin alloy, will be, $193.8 \times 24 \times .002 = \9.30 .

It is thus apparent that if the raw material can be delivered at a reasonable cost at the works, the processes can be conducted with some degree of success.

Other processes have been patented for the recovery of tin from tin scrap—as for example that of Vortmann & Spitzer, a fusion process, and that of Borchers, in which an electrolyte containing sodium chloride is used, but the writer is not aware that these are being worked upon an industrial scale, and therefore a description of them cannot be included in this series of chapters.

The future of the electrolytic tin recovery processes would appear to depend entirely upon the facilities offered for the collection of tin scrap at a low cost, and it is possible that in the future, when the collection and utilization of city refuse is placed upon a more scientific basis than is at present the case, the industry will develop into one of considerable importance. †

Concerning Chlorination.

VANCOUVER, May 30, 1898.

TO THE EDITOR OF THE "MINING AND METALLURGICAL JOURNAL," Stimson Block, Los Angeles, Cal.

SIR:—I beg to call your attention to an error in the description of the chlorination process, for the extraction of gold, which appeared in your issue of the 15th May, inst., namely, that "sulphuric acid and lime are added" to the roasted ore and water charged into the barrel, whereas, in reality, hydrochloric acid and lime are added.

I need hardly remind you that chlorine gas cannot be obtained from sulphuric acid and lime.

Yours faithfully,

(Signed)

J. O'SULLIVAN,

Chief Assayer and Chemist to the B. C. Agency, Ltd., Vancouver.

Mr. O'Sullivan was right when speaking of the question concerning the chlorination process, as described in May 15th issue: that sulphuric acid and lime cannot form chlorine gas, but if Mr. O'Sullivan will write out his chemical equation, concerning his advice as to making chlorine with hydrochloric acid and lime, he will find out that his mixture will be just as unsuccessful as the one above mentioned, as the reaction taking place will be: $\text{Ca(OH)}_2 + 2\text{HCl} = \text{CaCl}_2 + 2\text{H}_2\text{O}$, or, in other words, calcium chloride and water.

We will admit there was a typographical error made by saying "sulphuric acid and lime" instead of sulphuric acid and chloride of lime are added, as it should have been.

We will also refer Mr. J. O'Sullivan to Henry Wurtz's article in *The Mineral Indus-*

try for 1896, annual Vol. V. The Hydro-Metallurgy of the Precious Metals, pages 312 and 313:

"Chlorination has, like amalgamation, been subjected by inventors and projectors to a vast number of experiments, both alone and in conjunction with amalgamation. Chlorine has been used directly in its gaseous form—as first by Plattner—under ordinary pressure and under elevated pressure, sometimes under pressure high enough to liquefy it (that is 9 to 10 atmospheres) at ordinary temperatures; also in solution in water, and in liquids that make stronger solutions than water, also in very weak solutions such as are employable in open vats without suffocating the operatives. It has been employed after exhaustion of air from the ore. Instead of passing the gas through the ore, the ore has been passed through the gas. Many chlorinogens, containing potential chlorine have been used. Indeed, one of the commonest of these in use was employed by the earliest investigators, Persy, Duflos, and Lange. This is a mixture of common bleaching powder (chloride of lime) and muriatic acid (hydrochloric acid). With this Duflos reported good results, and Lange got better results than with free chlorine, as proposed by Plattner. * * *

In addition to the chlorinogenic mixtures already mentioned, there are others. The first patentee of a chlorination process, Spieker, used bleaching salt with sulphuric acid, instead of hydrochloric. This gives hypochlorous acid HClO , a very strong chlorinogen. Subsequently, others have used hypochlorous acid, first isolated and freed from the precipitate of gypsum, which must have embarrassed Spieker. Mixtures of oxalic acid and bleaching salt have been claimed to present advantages, also mixtures of bleaching salt and ferric chloride. Both these latter are transportable in solid forms, and hence present conveniences."

THE BONDING AND LEASING SYSTEM.

Mining men in Southern California seem to have neglected the advantages that have resulted to other mining countries from bonding and leasing mining properties. It is true that a certain amount of mining enthusiasm must be engendered in a certain district before this system can be fully put in practice, yet there are many properties scattered through the southern half of this state, owned by men who have a good thing, and know they have it, but are unable to furnish the capital to properly develop their mines.

The plan of leasing new and undeveloped property should thrive in Randsburg and similar camps, where the necessary faith in the country already exists, and particularly where the working miner as a lessee has facilities for the treatment and sale of his ore. Aspen and Cripple Creek are shining examples of what can be done with the leasing system, as hundreds of lessees who have made money in these places will bear evidence. Among the capital prizes drawn by lessees may be mentioned the Johnson lease on the Moon Anchor mine, at Cripple Creek, where the lessees took out in one year \$300,000, and brought an obscure mine into prominence as a bonanza. The Maroney lease on the Anchoria Leland produced \$235,000 in six months, and nearly a dozen sets of lessees on the Pike's Peak mine have become rich through leasing. It enables men of small means to get into a favored locality, and take

a chance at the capital prizes that are usually reserved for men of large means, and at the same time develop the owner's mine without cost to him but profit.

To illustrate the system: "A" owns a mine in a favorable locality that is undeveloped. "B" is a miner, or a man of small means who has been unable to get a mine of his own. "A" and "B" agree that "B" shall lease the mine of "A" for the term of one year, "B" to work 60 shifts per month, to have the privilege of taking, extracting and shipping ore therefrom, "B" paying to "A" as rent therefor either a straight or graduated royalty, running usually from ten to sixty per cent, after deducting milling or smelting and freight charges. Where a bond is given with the lease, an option to purchase is written out and usually accompanies the lease, in which it is agreed that if at any time, within the period of the life of the lease, "B" shall pay to "A" the sum agreed upon as the price of the mine, "A" will convey it to "B". The usual practice is for "A" to place a deed in Escrow in some bank, under an agreement that if "B" pays the purchase price within the designated period, the deed shall be turned over to "B". Sometimes, the payments on the bond are partial: the amount of the bond being \$50,000, "B" agrees to pay "A" \$5,000 in thirty days, \$10,000 in three months, \$15,000 in six months, and the balance in one year.

Sometimes mines are leased in blocks, and a dozen sets of lessees may be working at the same time on the same claim.

I am aware that a great deal of leasing and bonding are being done in Randsburg and vicinity, but not enough. Why should so many miners waste their time prospecting in the desert, where, if a mine is found, it will be impossible for the prospector with limited means to develop it and make it a paying mine when he can with much more hope of success get a lease near a paying mine where, if he strikes pay ore, he will have railroad and milling facilities that will insure him success.

In two or three years from now, the business men of Los Angeles will awake to the fact that many rich mines have been opened up in the back country, have passed into other hands and are beyond their reach, because they did not reach out and take them when they could have been obtained. For three years after the discovery of gold in Cripple Creek, Denver capitalists could not be induced to invest a dollar in the mines, while the Colorado Spring people, having faith from the start, invested and reaped their reward.

Prosperity.

"Speaking from a mining and smelting standpoint, I find that the west is surely more prosperous today than at any time since the depression, or great decline in silver, in June, 1893," said Simon Guggenheim, general manager of the Philadelphia Smelting and Refining Company. "There is no apparent reason why the whole mining section should not continue to prosper, even though the price of metals is somewhat depressed."

"It is true that not many new camps of importance are being discovered or developed, yet the mines that have been in existence for years are today making satisfactory profits, and there still exist many bonanzas, which show not only a large source of revenue to the owners, but give employment to many."

† The writer has recently learned that in some large towns old tins are being collected and sold for the manufacture of box clips. This method of utilization will, of course, tend to prevent the extension of the recovery processes.



FIG. 1. A GENERAL VIEW OF THE EXTERIOR OF MESSRS. HECKELMANN & MCCANN'S SAMPLING AND TESTING WORKS NEAR THE CITY OF MEXICO, MEX.

MINERAL TESTING AND SAMPLING WORKS.

The new mineral testing and sampling plant of Heckelmann and McCann were inaugurated March 26th. A large number of prominent gentlemen of the City of Mexico, besides the students of the School of Mines were present at the ceremonies.

It is a well known fact that many mines are closed down for want of a knowledge of some economical method of treatment. In many cases mines are so situated that the ore will not pay for shipment, but would yield a handsome profit if the proper kind of mill were erected on the spot for treating the ore at the mine.

By having such ores thoroughly tested, in order to determine the system of treatment best suited to them, one can go to the expense of the erection of the mill with the certainty that a definite percentage of its value can be extracted.

In many cases a system of a treatment has been inaugurated at a mine at great cost, which upon trial is found to be unsatisfactory and is condemned. It may be that this treatment is unsuitable to the ore in question. In this case a preliminary test of the ore in some testing works would have shown this at a comparatively small expense and have saved the mine owner thousands of dollars.

It may be that this treatment, although suitable to the ore is not giving good results because of improper handling and were a series of tests to be made, a method might be found to overcome the obstacles, and obtain a high percentage of extraction.

The general object of a Testing Works is to test any ore thoroughly, by all or any of the various methods of successful treatment, by which the precious metals are extracted from their ores in order to determine which method is best suited to the particular ore. These works are particularly useful to persons who are contemplating the erection of a mill at their mine, and desire to know what systems of treatment will yield them the best results.

They are also useful to those who have a mill of some kind in operation upon their property, and desire to ascertain whether a better extraction cannot be obtained by making some change in the existing methods of treatment, and they are exceedingly useful to

Every one familiar with the subject of Milling knows that in order to obtain the best results by any system of treatment, careful, patient, systematic and intelligent investigation is required, and this work cannot be done in a large mill, not especially constructed for this purpose, except at an enormous expense, and even then the test should be made by a metallurgist, especially trained for this experimental work, by study and practice of the best methods in use.

In Messrs. Heckelmann and McCann's sampling and testing works, a test may be made on a sample of from 500 kilos to 10 tons of ore, by all or any of the systems of treat-

Mining Engineers, who, while they may be able to judge from the character of an ore that a certain system may be suitable to it, yet cannot tell the exact percentage of extraction to be obtained thereby, without having tests made of the ore.

Fig. 4 gives a general view of the interior, where experiments are made in the treatment of ores on a practical working scale by the systems of Plate Amalgamation, Concentration, Roasting, Pan Amalgamation, Lixivation, Cyanide Chlorination.

Fig. 5. The Power Plant consists of an Iron Water Tank 8'x6'x8' with a capacity of 2000 gallons. A No. 22 Gardner low service tank pump. A Fraser & Chalmers 40 horse power tubular boiler 14'x44". An Erie City Automatic cut off governor Engine cylinder 10 x 12, giving a minimum of 35 horse power. No. 6 Gardner duplex boiler feed pump, and a No. 3 Standard feed water heater.

Fig. 6. Plate Amalgamation and Concentration. This plant consists of a Hendy 2 Stamp Tripple discharge 850 lb stamp Battery. Four Electro Silver-Plated Copper plates (one ounce of silver to the square inch). A 5 foot Hendy Triumph Concentrator, the necessary settling tanks, etc.

Fig. 7. View of the front of the Plant showing line of railroad over which the ore to be sampled is transported to the very door of the establishment.

Fig. 8. This illustration shows the lixiviation and cyanide plant in operation in Messrs. Heckelmann and McCann's Sampling and Testing plant. It consists of two leaching tanks 6' diameter 2' deep. Two precipitation tanks 6' diameter and 4' deep. One solution stock tank 5' diameter and 7' deep. One precipitation tank 3' diameter and 6' deep, and one Johnsons Laboratory Filter Press.

Fig. 9 shows another view of the interior with the amalgamating plates and concentrator in the background to the left of the picture.

Figures 10 and 11 show the plant for Pan Amal-

gamation to work the tailings from the Amalgamating plates and Concentration. This plant is composed of a 30" Amalgamating Pan, a 6" settler, a 19" clean-up Pan, an Amalgam safe and strainer, a 10" retort and a 16" bullion furnace. Settling tanks, etc.

The results depend very much upon the precision and care exercised in taking samples of the ore at different stages of the test. The sampling room has been fitted up with every convenience known to modern practice.

It has a cement floor 30'x60' and contains a 7'x9" Dodge Crusher; 12x12 geared rolls; a belt elevator 20' between centers; a revolving screen $\frac{1}{8}$ " round perforations; Fraser & Chalmers Sample grinder, Platform scales; sample finishing room, etc.

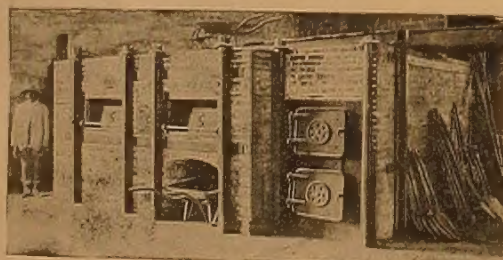


FIG. 2. FURNACES FOR CHLORIDIZING AND DEAD ROASTING.

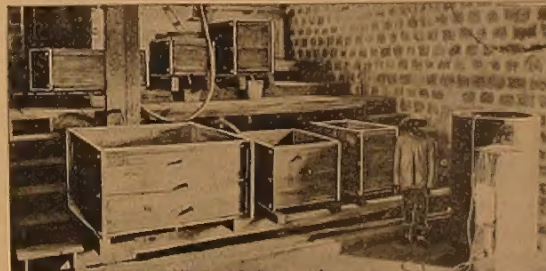


FIG. 3. CHLORINATION PLANT.

ment in use in order to determine exactly what percentage of extraction may be obtained from the ore tested.

Fig. 1 shows a general view of the exterior of the plant which is located in the heart of the Mexican republic a short distance from the City of Mexico, at a place called Nonoales, on the line of the Mexican National Railroad. A siding passes the front of the building.

Fig. 2. A front view of the furnace for chloridizing and dead roasting is shown in this illustration. This plant consists of two reverberatory roasting furnaces, separate and distinct from each other. Each having its fire box and a hearth 5'x10' with two working doors.

Fig. 3. The Chlorination Plant consists of a series of lead lined boxes. Two for chlorination by the Plattner process, the others, for precipitation and clean-up tanks. A nineteen inch Chlorine generator, and a Hydrogen generator.

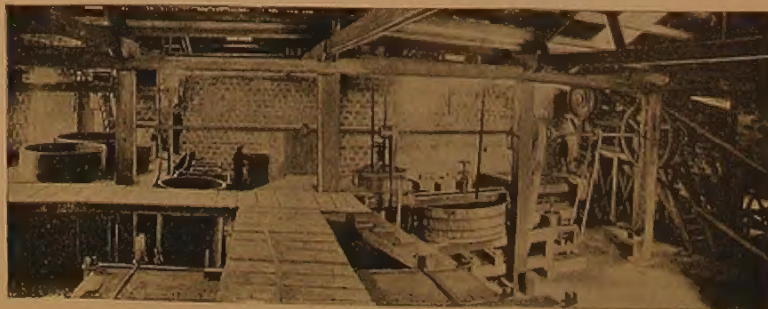


FIG. 4. GENERAL VIEW OF THE INTERIOR.



FIG. 5. POWER PLANT.

The difference between any department of this testing plant and a large mill operating under the same system, is not in the size, but only in the number of machines used in the mill, so that the conditions under which the tests are made are exactly the same as those in practice in larger establishments. The capacity of the Stamp battery Plates and Concentrator is, for instance from 6 to 8 tons per day, so that it can readily be seen that such tests are of real value, and that the results thereby obtained are the same as those obtained in large works.

In the test made in the plate amalgamation and Concentration department of the works, it is necessary at times to crush the ore through several sizes of screens before one can state absolutely whether the system is suitable

the mineral constituents by Plate Amalgamation and Concentration, and work the tailing from these processes by some other process, such as Pan Amalgamation, Lixiviation, etc.

The above example shows that in a simple matter, of a variation in size of the screen used, the results of the test may be decisive for, or against a certain system so that it is often necessary to have a series of tests made in crushing with different size screens, to determine, which will give the best results. This being the case, how much more necessary is it to make a series of tests in every other department of Milling.

In Concentration the results of the tests are influenced by the size of the material, quantity of water used, inclination of the table, rapidity of the shake, etc.

When roasting ores, the results are influenced by the temperature, length of time of the roast, amount of salt added, and time of adding the salt to the ore, and many other causes.

The results in Pan Amalgamation are determined by many factors, such as the fineness of the ore, the percentage of chlorination, temperature, time of operation, thickness of the pulp, quantity of chemicals used, etc.

The Lixiviation results very according to the fineness of the pulp, the degree of chlorination, the temperature and strength of Hypo solution.

In the Cyanide process, similar factors may enter into consideration.

By the Plattner process of chlorinating gold ores many other factors have to be considered;



FIG. 6. PLATE AMALGAMATION AND CONCENTRATION

metallurgist, mine inspectors, mineral land surveyors, brokers, promoters, mining exchanges and investment companies, together with the mining codes of the different countries, and digest of the statutes relating to corporations, liens and mining in the different states and territories and the Canadian provinces.

Poole Bros. Mining Directory is one of the finest directories ever compiled, containing about 35,000 names of people interested in mining matters.

The Digest of Corporation Lien and Mining Laws of the states and territories of the United States is a complete book in itself having been compiled expressly for the mining directory by thoroughly reliable and well known



FIG. 7. VIEW OF THE FRONT OF THE PLANT SHOWING LINE OF RAILROAD.

or otherwise. Take for instance the case of an ore in which the mineral is disseminated throughout the gangue in very small particles. In such a case, if the ore were crushed through a coarse screen say 20 holes to the square inch in order to secure a large output for the mill, the gangue would probably still contain so many mineral particles that one might decide that the ore was neither a free milling nor a concentrating proposition, whereas if the same ore were crushed through a fine screen, say 80 holes to the square inch, the separation of the mineral particles from the gangue might be so complete that it might be a very fine proposition for free milling or concentration. On the other hand, it might be more economical to crush through a coarse screen to separate only a portion of



FIG. 8. LIXIVIATION AND CYANIDE PLANT.

and in each system the test may require a number of trials before obtaining the highest percentage of extraction.

Now, since it is desire that the results given out shall be of permanent and real benefit to their clients, Messrs. Heckelmann & McCann are determined to give satisfaction. This can only be done by making patient and careful investigations, repeating each operation until the best results are obtained therefrom, so that these will be conclusive and trustworthy.

About \$20,000 has been invested in the entire plant, which has a capacity of about 8 tons daily, beside the erection of a good solid building in the outskirts of the City of Mexico.

Poole Bros. Mining Directory

and Reference Book of the United States, Canada and Mexico, contains a list of the Mining and Quarring companies and operators, smelters, reduction and sampling works, blast furnaces, rolling mills, iron and steel works, giving location of same, names of officers, annual output, stamp mills, coal breakers and washes, Coke ovens, etc., with the railways, water routes and express companies to all points at which above interests are located, or nearest shipping point.

It also gives a list of mining, mechanical and electrical engineers, assayers, geologists,



FIG. 9. ANOTHER VIEW OF INTERIOR

attorneys-at-law.

The Directory is an invaluable adjunct to any mining man's library.

One of the prettiest-covered catalogues we have beheld for some time is one issued by the Witte Iron Works Company, of Kansas City, Mo., builders of the Witte Gas and Gasoline Engines, descriptive of their engines. The utmost care is exercised in the testing of Witte Gas or Gasoline Engines. This firm has the facilities second to none in this respect, and keep every engine under full load for ten hours before finally letting it go.



FIG. 10. PAN AMALGAMATION PLANT.



FIG. 11. PAN AMALGAMATION PLANT.

CORRESPONDENCE

CALIFORNIA.

Garlock Mining District.

There are about 60 claims being developed in this district. Adam's placer claim is showing up well. The Beecher claim is also a good property, having produced ore running \$30 to \$60 per ton. There is a tunnel in on the ledge, 75 feet.

Carpenter & Grady have a fine piece of property, which assays from \$25 to \$35 per ton in gold. Other mines in the Mesquite Gulch are silver-bearing, but not much developed.

All Silent Friend mine and its extension, owned by Geo. D. Vedder and Chas. Orphin assays about \$40 per ton, and has a large quantity of good ore on the dump.

One of the most valuable group of mines in the entire range is composed principally of the Ben Hur and Dodica mines, owned and operated by Dr. W. H. Wright. The ore is free milling.

There are some very fine claims in the Mesquite Gulch that run very high in silver and gold.

There is also considerable dry washing carried on in this vicinity, and it is a profitable business.

There are now six mills at Garlock. Mr. Henry, of the Henry mill, expects to put in a cyanide process.

Mr. L. E. Porter, of the Porter Gold and Silver Extraction Co., representing Los Angeles capitalists, is also putting in one of their improved cyanide plants.

This year has been an exceptionally good one. The weather has been pleasant. The town is healthy and prosperous, and while there is no boom, this district is forging ahead, and there is an opening for investment here.

Miscellaneous Mining News.

ARIZONA.

John Francis, the well known mining and smelting man, returned last week to Tombstone from Middlemarch, in Cochise county. He reports that camp enjoying a high degree of prosperity. A sixty ton smelter is at work and the results are such as to justify the belief that prosperity has come to the camp to stay.

Los Angeles parties have become interested in some of the properties adjoining the Monte Cristo mines in Arizona. These properties are known as the Cosmos group. They have started with six men to develop them systematically. The gold belt in the same vicinity is also being prospected.

CALIFORNIA.

CALAVERAS COUNTY.

J. T. Armstrong of Los Angeles has bonded the Blizzard mine in West Point district, Calaveras county, from the Bardsley brothers, and will proceed to active development with a large force of men.

INYO COUNTY.

A mammoth gold ledge, forty feet wide, the ore giving an average assay of \$5 per ton,

has been found at Lone Pine, Inyo county, California. The ledge has been prospected for a distance of 2,000 feet, while the surface indications show that it is probably about a mile in length. The Inyo Mining Company has struck a rich body of copper ore on the 700 foot level of its mine, and will put in an additional plant for smelting the new ore. This mine is now yielding gold, silver, lead and copper.

KERN COUNTY.

It is reported that a new Electric Smelting Process is about to be erected near Garlock. The miners of that district will give it a most thorough test, and we hope it will prove a success.

Reports of a crusher and smelter being erected at Mohave continue to come in and assume a very plausible shape. With a smelter erected at Mohave, the mines of Southern California will make a showing for themselves.

The Eureka mill has been running some very rich ore for the past month, though it has come in small lots from different mines. The value of the ore crushed may be judged when it is known that the little two-stamp mill has turned out more than \$13,000 in bullion in the time mentioned.

The Ophir mill has just cleaned up on a run of about 100 tons of ore from the Burcham No. 1, but the amount we were unable to learn. It has already been demonstrated that the mine is a good one, and if the owners see fit to keep the results of their runs to themselves, it is no affair of the public, and the public should not expect to share the knowledge. There is entirely too great tendency to magnify the size of clean-ups in many cases, and we really admire the mine owner who has the good sense to keep his affairs to himself when the owner is a private individual and not a corporation. But when the corporate manager undertakes to keep the knowledge of what is going on from the stockholders, it is a different matter, and calls for an investigation. The Ophir mill is now engaged on another run of about fifty tons of ore from the same mine, so it is to be presumed that the results of the last run were very satisfactory.—*Miner*.

NEVADA COUNTY.

The Empire mine near Grass Valley, which is one of the deepest worked mines of the coast, is being rehabilitated. The old buildings which cover the hoisting works and milling plant are being torn down and replaced with modern and commodious buildings. In addition a number of improvements are to be made to the mill, which will reduce the expense of reducing ore. The concentrators are to be moved and placed upon a platform, and a room for drying the concentrates more rapidly will be made, mainly of glass. Two dams of considerable size will be made to hold the tailings, from the mill, which will be worked over by a scientific process.

RIVERSIDE COUNTY.

The Virginia Dale mining district will not be permitted to remain idle this summer. Water has been secured in abundance and with the erection of several mills to work the ores, incentive is offered to prospectors and owners to proceed diligently with their labor.

SAN DIEGO COUNTY.

C. W. Pauly, receiver of the Golden Cross mines at Hedges, has filed in the superior court his sixth monthly report. The clean-up on May 1 yielded \$45,018.61 in gold bullion. From other sources \$1,428.60, making the total receipts for April \$46,447.21. There was paid out for the company \$42,323.06, which included \$11,500 paid to creditors. The company had \$56,941.02 on deposit in the bank on April 30. The above clean-up was from 100 stamps. On the first of June, an additional forty stamps were put in, and will be run continually, making 140 stamps now dropping.

TUOLUMNE COUNTY.

For some time it has been rumored that a rich strike has been made in the Golden Treasure mine, owned principally by attorney Flack of Stockton. While the owners do no talking, it is known that in the 80-foot drift the ore grew richer as the upper wall was approached, and it is not at all surprising that an exceedingly rich streak should be found near the hanging wall. Much money has been expended on this property, and the owners well deserve their good fortune.

COLORADO.

The season's work at Taylor Park was begun about the first of last month, and with 50 men employed are now engaged in sluicing and washing the dirt and gravel down to bedrock. The force of men will soon be increased to 75. The Taylor Park Company, of Gunnison, owns about 3,000 acres of good placer land, which is patented and now in shape to be developed rapidly and systematically. The ground is very rich in gold, and the placers have been operated off and on for the last thirty years. In the past two years the company has spent at least \$300,000 in constructing a long ditch and building flumes for the carrying of a large flow of water.

The Belman mine, on Pewabic Mountain, near Idaho Springs, is receiving some attention from Mr. Depew and his friends, and negotiations are under way with Mr. Phil Mixsell for a right of way through the Mixsell Tunnel. The Belman has a large amount of development, and a vast quantity of mill dirt and ore is opened up, but the water excess has hitherto proved the great drawback. The right of way through the tunnel will develop down to 270 feet of depth, drain out all the water and open up ore for ten years to come without further depth.

Leadville Notes.

The lower Henriette shaft, of the Maid of Erin Silver Mines Company continues to ship lead-carbonate ore steadily, under the management of several sets of lessees.

The engineering corps of the Denver and Rio Grande Railroad are now surveying around the various shafts of the Ibez Mines and the flat in Idaho Park. It is reported that work will soon commence on the construction of the railroad to the mines.

The Yak Mining and Milling Company, working a large acreage through the Yak tunnel, are increasing their output daily. Five railroad cars are now sent out daily, beside considerable development work being kept under way. All mining is done at a minimum expense on these workings.

MICHIGAN.

Copper.

About 50 men are now working at the Arcadia mine, now under the control of N. F. Leopold. Two quarter sections of land adjoining the property were bought by Mr. Leopold recently.

At the Winona mine 30 men are busy. A new hoist, air compressor, etc., are to be put in soon.

The Wolverine mine now employs 320 men, as against 175 a year ago, and 21 power drills are used.

MINNESOTA.

Heavy rainstorms at Virginia last Friday night did much damage to the Oliver and Ohio mines, as well as to the Auburn and Norman, in less degree. A large amount of ore, estimated at some thousands of tons, was washed from the Ohio into the Oliver cut, and much earth was run over the ore in the mines. Several days were required for cleaning up the properties. Auburn and Norman were both stripped, but mine by the milling process, so that the loss was not so great.

MISSOURI.

Joplin Ore Market.

Better weather for mining operations could not be asked for than prevailed during last week at Joplin, Mo., and the output was an exceptionally good one. The price for top grade zinc ore remained steady at \$27 per ton, but lower grades advanced from 50 cents to \$1.00 per ton. Lead sold all the week at \$21 75, but the condition of the pig lead market gives promise of an advance in local markets this week. About seventeen cars of jack brought \$27 per ton, about seven cars of Joplin ore selling at that price, six cars from Scotts City and four from Belleville.

For the corresponding week last year, top grade zinc ore sold at \$22.50, and lead opened the week at \$20, closing at \$21 per thousand, but the shipments for the week just closed beat last year's record by 2,555,970 lbs of zinc and 79,060 lbs of lead, and the value was greater by nearly fifty thousand dollars, the exact figures being \$49,943. For the corresponding 21 weeks last year the zinc shipments were less than for this year by 39,306,910 lbs, but the lead shipments were greater by 1,880,900 lbs. The value of the shipments were less by the enormous sum of \$713,120.

As compared with the previous week the shipments for the week show an increase of 817,370 lbs of zinc and 163,760 lbs of lead ore and the value was greater by \$14,114. Following is the turn-in by camps:

WEBB CITY.

	ZINC.	LEAD.
Center Creek.....	318,010	10,740
G. & S. Co.....	11,380	
Litchlitter.....	9,190	
Free Coinage.....	9,140	
Columbia.....	8,433	
Della S.....	6,950	
Pearl C.....	6,400	
Hough.....	2,810	930
Curtis & Haymond.....		2,850
Noble.....		2,760

Total..... 372,310 17,280
Value, \$5,029.

JOPLIN.

	ZINC.	LEAD.
John Jackson.....	238,340	
Joplin Prospecting Co.....	137,500	
Granby Co.....	136,640	23,750
Hustler Manufact'g Co.....	131,990	33,150
Chitwood Hollow M. L. Co.....	89,800	
Missouri Co.....	71,600	2,020
Roaring Springs.....	65,030	
Empire.....	58,290	3,020
Three Friends.....	53,500	
F. N. Perry.....	50,840	18,120
Witch Hazel.....	40,640	
North Heights.....	36,940	2,160
Rex.....	35,210	23,210
Victor.....	34,020	11,260
Snap-Warren.....	33,370	5,290
Tan Yard.....	15,500	
South Joplin, L. & Z. Co.....	14,640	5,280
Dickerson.....	13,960	
Top Run.....	12,390	24,840
Plunkett.....	12,250	1,650
Idaho.....	10,690	1,340
Lehigh.....	8,750	
Harrison.....	6,990	6,360
Leonard.....	6,780	3,180
Spring City.....	6,600	
Mohaska.....	6,540	
Gibson.....	6,070	
Kelley & Co.....	6,000	
Harvard.....	5,750	3,320
Scott.....	4,440	
Wright.....	3,500	1,750
J. H. Taylor.....	23,110	
Becky Sharp.....	22,840	
Great Western.....	22,550	
Yale & Co.....	18,570	
Aunt Patty.....	13,100	
George Case.....	10,590	
Fairview.....	5,290	
Ashcraft.....	1,600	
Sundries.....	7,330	9,960

Total..... 1,361,890 298,300
Value, \$24,533.

CARTERSVILLE.

	ZINC.	LEAD.
Get There.....	147,080	50,320
McKinley.....	137,960	4,700
Eleventh Hour.....	110,450	10,350
Chatham.....	104,750	28,510
Beckwith, Hall & Co.....	83,090	54,540
Davey & Son.....	76,510	5,880
Troup.....	62,410	5,990
Davey & Henderson.....	9,990	14,860
D. H. & D.....	6,240	9,410
Hannum & McElroy.....	14,490	
Burgner.....	3,270	
Brinkley.....	1,030	

Total..... 738,880 212,350
Value, \$13,865.

ORONOGO.

	ZINC.	LEAD.
La Tosca.....	99,080	
P. E.....	98,000	
Gaddis M. Co.....	90,810	
Aurora.....	122,710	
Cass & Co.....	44,560	
Sunshine.....	14,810	
Little Blanche.....	64,740	
Maves.....	26,920	
Hatton.....	11,650	
Milsbaugh.....	1,410	870
Johnson.....		660
Sundries.....		210

Total..... 578,590 1,740
Value, \$7,292.

DUENWEG.

	ZINC.	LEAD.
Grounds & Irwin.....	554,050	55,000
Duenweg.....	278,820	179,450
Crown Point.....	38,910	41,430
Syndicate.....		5,500
Gem Co.....		900

Total..... 871,780 282,280
Value, \$15,601.

CENTRAL CITY.

	ZINC.	LEAD.
Short Creek.....	186,660	12,190
Lone Lady.....	66,300	1,470
Iowa.....	51,050	3,010
Inter-Urban.....	42,400	
McHenry.....	21,400	
Kenwood.....	19,400	1,100

Total..... 387,230 18,070
Value \$5,324.

AURORA.

	ZINC.	LEAD.
Minor & Rogers.....	140,790	3,000
Other lands.....	571,000	

Totals..... 720,000 3,000
Value, \$6,300.

SCOTT'S CITY.

	ZINC.	LEAD.
Brumbeck.....	156,080	
J. B. Davis.....	40,830	
Riley Stevens.....	20,180	

Totals..... 226,390
Value, \$3,057.

Galena.....	3,022,870	364,910
Value, \$45,714.		
Hell's Neck.....	237,420	
Value, \$3,147.		
Carthage.....	64,000	
Value, \$832.		
Belleville.....	168,180	
Value, \$2,270.		
District total.....	8,749,540	1,108,000
Value, \$132,964.		
District total, 21 weeks	175,468,150	23,177,300
Value, \$2,427,608.		

MONTANA.

The Silversmith, in the Basin district, is doing considerable development work again, and a small mill may be built.

Nine & Miller, who have been working the Park mine under sublease from Brady Hanson, shipped a car of ore last week.

James J. Brooks and Dave Rehili have opened up some placer ground on Basin creek and expect to make a cleanup soon.

Several men were put to work on the Katie smelter at Basin last week to get things in shape to commence putting up the big iron structure. Several teams are also hauling the iron from the cars.

There are several tons of iron at the Snow Shoe awaiting transportation. The teams now on the road are not sufficient to handle the product. The price being paid for hauling is \$4.50 a ton.

A find of rich ore is reported from the Little Lottie claim, in Ohio Gulch, the property of Leptien & Reynolds. The prospect is at present under bond to G. W. Walker, agent of the Northern Pacific at this place, who is sinking an incline shaft on the vein, now down about 25 feet.—*Helena Independent.*

NEVADA.

The smelter at Golconda was started June 14th. This and the concentrator adjoin. The last named has been in operation for several months.

The shipment of ore from Fred Weber's Cat Creek mine, says the *Hawthorne Bulletin*, milled \$42 per ton. It looks as though Fred will make some money out of his mine, and everybody will be glad of it, for he has been playing a losing game a long time. Charley Miller is now foreman of the mine.

NEW MEXICO.

Output of Hillsboro gold mines for the week ending Thursday, June 23d, 1898, as reported for *The Advocate*:

	Tons
Wicks.....	10
K. K.	10
Richmond.....	10
Happy Jack.....	5
Snake Group.....	40
Opportunity.....	10
Sherman.....	5
Prosper.....	5
Eighty-five.....	—
Rex (silver-lead).....	5

Total 100

Total output since Jan. 1, 1898.—3,730.

OREGON.

The Daisy mine, on Jump-off-Joe, is now under bond to J. G. Underwood et al. of San Francisco, and they have commenced work to pump the mine out. When it is developed, it is likely to make one of the best paying mines in Oregon.

The Ashland mine made a clean-up this week of 160 tons of ore—the third under the present management—and the result is stated to be highly satisfactory. They shipped on Monday a carload of concentrates to the Tacoma smelter.

R. Van Brunt, of the Steam Beer mine, says the new ditch will be completed next week, and will carry between 3000 and 3500 miners' inches of water, which will enable the company to run their mine six to seven months every year.

Hickler & Berrey are having built at Tolo, Ore., a boat 30x70 feet to dredge the Rogue River. The Risdon Iron Works have the contract. The machinery consists of three engines, one driving an endless elevator of 36 buckets, each bucket of a capacity of 800 to 1000 pounds of gravel, of a speed of 18 buckets per minute, handling from 200 to 3000 yards per day. One engine drives the buckets, one a centrifugal pump for washing the gravel, one an electric light plant. The machinery runs night and day.—*Oregon Mining Journal*.

SOUTH DAKOTA.

The Sunnyside mine, on Newton Forks, is showing good results as depth is reached on the vein.

The Union Hill Mining Company will soon proceed to survey all mineral locations belonging to the company for patent.

It is reported on good authority that a large and valuable chute of ore was recently en-

countered in the Rau mine, on Squaw Creek.

The Holy Terror Company at Keystone is rapidly pushing a drift east from the 500-foot level, for the purpose of intersecting the Keystone veins.

In the Chicago, Two-Bit and the Gold Hill Mining Companies' shafts, the water has of late become very troublesome, taxing the pumps to the utmost to keep it under control.—*Black Hill Mining Review*.

UTAH.

At the Ajax mine at Mammoth the shaft has now reached a depth of 475 feet, and the change in the condition of the ground gives fair indication of the near approach of ore.

Bullion-Beck of Eureka paid its dividend of 10 cents per share, or \$10,000 on June 15th. This carries the total dividends paid to date to \$2,495,000. No new ore contract has been entered into, and pending this the property will ship no ore.

Continental-Eureka, one of the great mines of Eureka, reported shipments of ore running high in copper.

Four Aces mine of Silver City made a shipment of ore which netted \$57.60 per ton. A very good grade of ore. The annual meeting of stockholders was held during the week and the old board of directors re-elected. The mine continues to improve.

The Dalton & Lark company, of Bingham, will commence the extraction of ore next week and will probably continue on indefinitely.

The condition at the Ceyser-Marion mine of Mercur are reported as favorable, and the new superintendent is introducing new methods of an economical nature. The mill is working 100 tons of ore daily and the batteries are working higher than for some time past.

The Grand Central mines of Mammoth, which have lately come into prominence, paid its first dividend of 12½ cents per share, or \$31,250, on the 15th of June. The company is making some phenomenal shipments, and the total for the month of June will probably reach \$100,000.

Horn Silver is expected to pay its quarterly dividend of \$20,000 July 1st.

The usual dividend of 5 cents per share will probably be declared on the 20th and payable on the 30th by the Mammoth company of Mammoth.

WASHINGTON.

Recent reports from the new Republic camp would indicate that it will soon begin to dawn upon the mining world that the greatest mining camp ever discovered is that embraced within the bounds of the Colville Indian reservation in Stevens county. It would seem that wherever the earth's surface has been scratched, rich gold-bearing ore was uncovered in quantity that would satisfy the most avaricious. It would seem also that the camp had not even been slightly prospected yet. Even in the Republic, where development has been carried on for a year past, the owners do not yet know what they own except it is one of the big mines of the world. What they have been following as a wall has turned out to be the richest body of ore in the mine. From other sections of the camp comes the report that wherever a ledge is prospected, values have been found that indicate surely that "gold exists where you find it."

The Republic mill has at last started up

and is being adjusted to its work as rapidly as possible.

Parties returning from the mines of Stevens county say that Spokane men are met with on every trail and on every camp. Virtually, Spokane owns Stevens county.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

Active development work is proceeding on the following closely connected mines of the Illicillewaet. Hoisting and pumping works are being erected in the Tanguier, and a concentrator and tramway in the Waverley, whilst a narrow-gauge railroad will shortly connect both properties with the C. P. R. main line. The English stockholders in the owning companies ought therefore this season to learn fairly thoroughly the true value of the mines that have been so highly eulogized by the managing director, Mr. Grant Govan.

It is stated that the Great Northern mines are being much better worked under the superintendence of the present manager, and that there is now found to be rather less of the presence of troublesome amounts of zinc than previously supposed. It is therefore hoped for tangible results ere long.

MEXICO.

San Luis Potosi.

The mines of this state for the last year produced precious metals to the value of \$4,600,000, being \$1,300,000 more than the product of the previous year.

Hidalgo.

La Perigrina, of Real del Monte, has made a rich strike which has sent the stock of this company soaring skyward. It is thought that a large ore body will soon be blocked out which will cause the stock to go even higher.

La Reina, of the Real del Monte, is fulfilling the expectations of those who have held that this mine was a bonanza.

Zacatecas.

The new 20-stamp mill has just been completed by the Compania Industrial Mexicana of Chihuahua, for the famous San Luis del Oro gold mines. Mr. W. H. Armstrong, the well known mining man who was selected as referee, has gone to the property to examine the plant and report upon its status, with reference to the contract under which it was furnished, no doubt is entertained that his report will show that the machinery is equal to that made in the U. S. This property, in the opinion of all the best mining experts, has a brilliant future ahead of it. About 5,000 tons of good grade milling ore is ready on the surface to feed the mill, and there is ore enough in sight inside of the mine to insure dividends for the next generation.—*Mexican Trader*.

Batopilas has yielded \$300,000,000 and Santa Eulalia or Chihuahua El Viejo, from 1710 to 1800, nearly \$400,000,000, and since then has continued producing 2½ millions annually, until the work was stopped. Five years ago the work was recommenced in this lode, and in 1896 there were taken out of it 32,000 tons of metal for exportation. In 1897 100,000 tons were exported.—*Enterprise*.

Mining and Transportation of Ores.

The June issue of *Mines and Minerals* of Scranton, Pa., has the following very interesting article on some of the methods practised in British Columbia and the conditions of Geography and climate, which necessitate them, written by Wm. M. Brewer of Victoria, B. C.

There are several interesting features connected with mining in British Columbia, and some among them peculiar to this northern latitude. Climatic conditions must necessarily influence operations, and for reasons which I will explain later, the winter season is, at present, the period when the mines in the Slocan and Kootenay districts are most extensively operated, and when the bulk of the ore is shipped.

Nature has provided highways for travel through this northern country, which have aided the development of the mountain districts to a wonderful extent. I refer to the occurrence of navigable lakes and rivers, by means of which prospectors have been enabled to explore a country that would otherwise be almost inaccessible, because of the mountain ranges and heavy timber. A reference to the map of the district will readily demonstrate how useful have been these waterways in connecting the different districts, and to how great an extent have the railroad companies been assisted in opening up communication.

Leaving the Canadian Pacific Railway at Revelstoke, 379 miles east of Vancouver, you take a branch road 27 miles to Arrowhead, where the Columbia river enters. The upper Arrow lake which extends nearly due south from that point, a distance of about 30 miles, and an average width, nearly uniformly maintained, of about two miles. From its southern extremity the river, after flowing a distance of 18 miles enters the lower Arrow lake. This has a length of 57 miles, but is not as wide as the upper lake. This entire system of waterways is navigated by stern-wheel steamers, which sail in connection with the trains on the Canadian Pacific main line. East from these lakes is the Slocan lake, which forms a link in the chain of communication between Nakusp and at the lower end of the Upper Arrow lake, Sandon the main camp of the Slocan district, and Nelson the chieftown in the West Kootenay district, are situated on the east shore of the west arm of the Kootenay lake. This lake in its turn forms a highway for travel through both the east and west Kootenay districts, as the main line extends about 30 miles in either direction, northerly and southerly, from the point where the west arm empties into it.

To the westward from the Arrow lake occurs the Okanagan lake, which is connected with Canadian Pacific main line by a branch from Sycamous to Vernon. A railroad has been projected from Penticton at the southern end of this lake easterly through the Boundary mining district, to intersect the Trail Creek West and East Kootenay districts and connect with the Canadian Pacific main line at Dunnmore in Assiniboia.

The territory enclosed by these connecting highways comprises that mineral section of British Columbia, which produced during 1897, gold, silver, lead, and copper ores to the value of \$6,929,299, and which in 1890 was practically a wilderness, and unexplored by the prospector.

One of the most noticable features connected with mining operations in these districts is the fact that the topography of the country is such as to render possible the working of mines by tunnels and drifts, instead of shafts,

either vertical or incline, as is usually the custom. The large surface area, nearly 52 acres, which constitutes a quartz-lode location, permits such a method of working many claims which would be impossible under the regulations of the United States, where only about 20 acres is the maximum surface area permitted. In British Columbia a lode claim must be located 1,500 feet in length and 1,500 feet in width, with all the corners forming right angles and no rights to follow the dip of the vein beyond the side lines as is the case in the United States. It will be readily seen that with such a width in a mountainous country it is comparatively easy to drift on a vein at several different levels within the side lines, even though the dip should not exceed 30 or 40 degrees. The ability to pursue such a method enables the mine owner to unwater his property by natural drainage flowing through the tunnels, instead of being compelled to install expensive pumping plants.

Another advantage gained is in being able to tram ore and waste through the tunnels instead of erecting a hoisting plant. A great saving in the expense of working is also made by being relieved of the expense of sinking deep shafts, either vertical or inclined.

In the Silver King mine near Nelson, which I visited lately, the economy of being able to work with tunnels was very clearly demonstrated. The workings are 400 feet vertical depth, comprising four tunnels run in from different levels; these are all connected by overhead stoping, and the ore mined from the higher levels drops to the lowest through chutes, whence it is discharged into the trams, and transported to the station of the aerial tramway. In narrow stoping an advantage is gained by affording an opportunity to do underhand stoping and allowing the ore to fall down through an upraise to tram level.

There are but very few mines worked in this section by shafts and hoists at the present time, but, of course, as depth is attained, such a system will be found necessary, although, in many instances, it will be found that such methods need not be adopted above 800 feet, and sometimes deeper.

The question of transportation of the ore from the mines, has been quite a serious obstacle to overcome because the mountain slopes are so precipitous. The ore belonging usually to the smelting variety, being either silver, lead and copper, or gold and copper, has to be hauled to either the nearest railroad station or lake-dock, often five miles or more distant, for shipment to the smelter. The camps are comparatively new, consequently but very few wagon roads have been built, the miners contenting themselves with the opening up narrow pack trails of the switch-back variety. By these they are enabled to pack the ore down the mountains in the summer, using mules or horses and loading from 200 to 300 pounds on an animal which is quite expensive.

The deep snow in the winter affords an opportunity to "rawhide" the ore, by which means an animal can haul from one to one and one-half tons. This system of haulage is quite unique, and can only be practiced in countries where the snow is deep. The hide of a steer is used. This is spread out with the hair side down, the sacks of ore are piled on to the skin and kept in place by the legs and sides being folded over the sacks and laced across with rawhide thongs, the tail and head also being fastened together. A log chain is passed around the load to act as a rough lock and check it from sliding too fast

down the slippery trail. A singletree is fastened to the head-end of the hide, to which a horse is hitched. The trail is broken on such a grade as to compel the horse as it travels to pull a little, which, of course, steadies the load. In the rawhide train, which consists of a sufficient number of animals to transport the daily output of the mine at one trip, there is one man to look after three or four animals and prevent accidents liable to occur by reason of a horse or mule making a mis-step into the soft snow. As this is anywhere from six to twelve feet deep and sometimes even deeper, and as the trails are nearly always along the mountain sides, of course a mis-step may be followed by the precipitation of animal and load hundreds of feet down the gulch below.

Because of the economy of this system of transportation when compared with packing, is the reason why the owners of mines in British Columbia prosecute work more actively during the winter than summer months.

During the spring usually all hauling is suspended because of the danger from slides, for when the accumulated snow on the sides of the mountains commences to melt, the water runs under it down the mountain causing the entire mass to slip and, without warning, slide down carrying with it timber torn up by the roots, houses, or anything in its path.

Gradually aerial cable haulage is being adopted wherever practicable and there are already several of both the Hallidie and the Bleichert pattern in use. Some of these are of considerable length; that at the Silver King mine at Nelson being $4\frac{1}{2}$ miles; one at the Payne mine at Sandon over 3,000 feet in length, besides one projected at the Reco mines near Sandon 9,993 feet in length, with one span 2,750 ft. long, 560 ft. above surface.

At the Silver King the Hallidie pattern is used, and, although an elevation of 4,000 feet is gained in the $4\frac{1}{2}$ miles, the attempt was made to install the cable in one section, but afterwards was found necessary to erect a midway station, thus making two sections. The length of the spans average about 400 feet, and the carrying capacity is about 300 tons daily.

At the Fern gold mine near Nelson, the mouth of the main tunnel is about 1,200 feet vertically above the ore bins in the top story of the stamp mill. A gravity tram track has been built on trestlework with a 52 per cent. grade to transport the ore from the mine. It was necessary because of deep snow to build these trestles about 12 feet above the surface of the mountain side, but it works splendidly, the loaded car pulling up the empty one, and making the trip in $2\frac{1}{2}$ minutes, the length of the track being about 2500 feet, and capacity of tram about 3,000 pounds.

The methods of timbering usually practised in the Slocan and Kootenay districts in the stopes is to set stulls, and where necessary put in lagging; but at the Silver King mine where some of the stopes are over 40 feet wide, and the vein dips about 45° , square sets are used 8 feet 6 inches high, the timber being 12"x12"; these are built to follow up the stope, and the ore taken out clean, the top set catching up the bottom set in stope above.

Whenever an opportunity presents itself through taking out waste rock, this is used to fill in, and the timbers are taken out to be used elsewhere. By following this system the cost of timbering is high, but this is offset by mining all the ore, and leaving no pillars, which is quite an important feature because the ore is high grade in silver, lead, and copper.

Copper Mining on Lake Superior.

(From the Western Mining World.)

The Calumet and Hecla Mining Company, proprietors of the richest copper mines on the face of the earth, employ upwards of five thousand men. The monthly pay roll reaches the enormous sum of \$400,000. Its annual receipts average \$14,000,000, from which dividends at the rate of \$40 per share are annually declared. The total dividends paid by the company, since its organization in 1867, amount to over \$52,000,000. The total receipts of the company to date amount to more than \$385,000,000.

The belt of the Calumet conglomerate lies in township 56, north of range 33, west of the meridian of Michigan. Overlying the vein is a cupiferous amygdaloid rock, while its floor or footwall is composed of trap rock. The first original opening to discover the vein and determine its value was made in the latter part of August and the first ten days of September, 1864, under the superintendence of Mr. John Hulbert. The report of the discovery of the Calumet conglomerate was made by Hon. Edwin J. Hulbert to a Mr. Weeks, secretary of the Hulbert Mining Company, on the 10th day of September, 1864. The first barrel of conglomerate was shipped away on September 11 of the same year, when it was sent to Boston parties to test the truth about the vein carrying 4 per cent copper.

The first active mining by the present company was begun in 1867, in which year the initial shipment of 768 tons of copper was made. From that year the product of the great mine kept on increasing, till now the annual shipment has reached the enormous weight of 96,000,000 pounds of copper.

To illustrate the position which this company holds on the copper market, it may be mentioned that, of the 65,870 short tons of copper mined on the Lake during 1869, the Calumet and Hecla produced 39,220 short tons, or more than one half, and taking the combined product of all the Lake Superior mines since 1856 up to the present year, we find that the Calumet and Hecla has produced two-thirds.

The conglomerate formation in northern Michigan, extending from Portage Lake northwesterly to Keweenaw point, and thence across the great Lake Superior to Ontonagon, is a conglomeration of pebbles in solid form, with an intermixture of pure native copper.

The method employed in mining this vein is as follows: The shafts proper, which reach to the bottom of the mine, are timbered from base to summit, pine timber being used clear through. Levels are uniformly ninety feet apart, which afford access to the different parts of the mine. Through these levels the copper rock is brought to the main shaft by tram cars, that switch to and from the different openings. At the intersection of each level the ore is dumped into the skip, which runs up and down the main shaft at a speed of 600 feet per minute. At the summit the skip rises to the top of the rock house, where the ore is automatically dumped into the ore crushers, thence into the ore cars, whence it is carried to the mills for treatment. The vein is punctured by diamond drills, the average depth of each hole being five feet.

In the Calumet and Hecla mine some seventy-five drills are operating and they blast twice a day. During the forty years of mining on the conglomerate bed, which averages 12 feet, has never lost its width, while the thickness ranges from 15 to 25 feet. The width and thickness of the amygdaloid vein,

however, is very uncertain. Sometimes they are found to measure 25 feet across, while at other times but a few inches. The conglomerate is a dull red in color, while the amygdaloid is a dirty gray.

The characters of both lodes are such that the most economical way to mine them is by slopes. By slopes is meant inclining toward the vein and under it near the footwall, and working obliquely around it.

The Calumet and Hecla stamp mill, the largest of the kind in the world, is situated at Lake Linden. There are practically two mills in one, of eleven ball heads each, and having a capacity of 6,000 tons conglomerate per day. The metal is found deposited in the rock in all possible forms.

The separation of the copper from the rock is effected by passing the stamped rock over a system of jigs, whereby the sand, by its less specific gravity, is floated off into a steady current of water, and the copper being the heavier, settles and falls through the sieves. One line of jigs succeeds another, over which in succession the copper which has just passed through a previous set of sieves, is made to pass, and the sand which is sustained in the water is carried away by the current of water to the lake by a system of sand wheels and launders. The number of jigs and the velocity of the current are so regulated as to secure the desired separation, with very little loss of copper.

(To be Continued.)

◁ MINING LAW. ▷

All questions and disputes concerning mining law, if addressed to the JOURNAL, will be answered under this heading by F. M. JENNERY, mining attorney. The latest important court decisions on mining cases will also be given.

(1.) I own a ranch of fifty acres, and leased the same to a party, giving him the exclusive right to bore for oil and reserved the surface for farming purposes. If the boring was successful, he was to have a lease for five years, if not, at the end of six months the land was to revert back to me. Six months have already passed since he commenced work under the lease, and he has not been successful. He now claims he has one year in which to complete his work. What is my remedy, he has possession?

(ANS.)—Your remedy is by an action of ejectment in the Superior Court. You can put him off of the land. A case very similar to yours is found in the 63 Penn. State Reports, page 397.

(2.) I hold a bill of sale of an unpatented mining claim. Is it any good?

(ANS.)—You do not say what state your mining claim is located in. I assume it is in California. A bill of sale, not under seal, was held in case of Clark vs. McElvy et al., 11 Calif. 154, to be good to convey the interest of the vendor. If possession was given at the same time, I think there is no question about it.

The Supreme Court of Colorado has held that a verbal agreement of sale, accompanied by possession, is a good transfer of title of an unpatented mining claim.

The same question was passed on in this state, in 46 Cal., 190. A mining deed is the proper conveyance for an unpatented claim.

(3.) Is notice to a director of a mining company notice to the company sufficient to bind the company?

(ANS.)—Answering your question in the general way in which it is asked, I will say no; but there may be circumstances under which notice to a director is notice to the company, as notice given to a director at a

meeting of the board of directors will bind the company.

(4.) Can the president of a mining company foreclose a mortgage on the property of the company while he is president?

(ANS.)—Yes. The same as any other person.

(5.) Can one who is not a citizen of the United States patent a mining claim?

(ANS.)—No. An alien can neither locate, own or patent an unpatented mining claim.

(6.) Is there any provision made by the U. S. government to assay minerals?

(ANS.)—No, not for private parties. This is entirely an individual matter.

(7.) Myself and three others own a lode claim, and a conflicting claim has advertised to patent a portion of our lode. Only one of the owners of our claim is a resident of the state. I understand it is necessary to adverse the other claim. Can I do this, or must all the other owners join with me?

(ANS.)—You can file the adverse on behalf of yourself and co-owners.

PERSONAL NEWS ITEMS

C. GILBERT WHEELER, of Chicago, Ill., who for twenty-one years was Professor of Chemistry of the University of Chicago, is in San Diego county, California, examining mining properties. He intends to visit the International Mining Congress at Salt Lake, Utah, next week.

JER POST and H. M. SWAN left Park City, Utah, last week for Mexico to accept positions as amalgamators in the mills of the Esparanza Mining company. The company's works are at Fultenango, Estado de Mexico.

DR. B. O. WENN of Los Angeles, of Hard Cash mine fame has become identified with a free gold proposition in the "Mother lode" in Tuolumne county, which gives promise of big results at an early date.

ARTHUR WORTH, chief mechanic for the Old Dominion Copper Mining and Smelting company, left Globe, Arizona, last week for Alameda, Cal., where he has come into possession of property, through the death of his father.

DR. W. ILLINGSWORTH of Chicago, who has spent the season in Los Angeles, has returned to his home. He acquired interests in gold near Prescott, Arizona, which run from a trace to \$50 per ton, free gold.

M. F. WYNN and JOHN OLDHAM left Park City, Utah, for the Lewiston gold district of Wyoming on a several months prospecting trip.

E. L. MONTGOMERY has been appointed Supt. Utica mine, Angels, Cal.

STEPHEN A. DORSEY, formerly United States Senator from Arkansas, and now operating the Piacho gold mines in San Diego County, Cal., has been visiting Denver, Colo.

SECRETARY OF THE INTERIOR BLISS expects to be present at the International Mining Congress at Salt Lake City, Utah, next week.

GEORGE B. CLARK, manager of several silver and lead mines near San Luis Potosi, Mexico, has been spending a few days in Pittsburg, Pa.

W. R. CHADBOURN, Gen. Mgr. Mikado mine, Leadville, Colo., is examining the Lindsay mine, Maybert, Cal., with a view to bonding it for his company.

J. C. PORTER of St. Louis, president of the Hope Mining Company, has been examining the company's property at Phillipsburg, Mont.

ROSS B. BROWN, accompanied by R. McKENZIE and KARL HOFFMAN, is examining the German mine, near Washington, Cal.

AUG. R. MYRER, president of the Consolidated Kansas City Smelting and Refining Company, was a visitor to Leadville last week.

R. A. F. PENROBE, Pres. Commonwealth, Ariz., G. M. Co., who recently bought the Jupiter mine, Cochise Co., Arizona for \$75,000, is examining mining property at San Bernardino, Cal.

I. BAHR has returned to Leadville, Colo., after an absence of some weeks looking after his interests in Mexico.

THE MARKETS.

NEW YORK, June 22nd, 1898

The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER.	COPPER.	LEAD
June 9	53 3/4	11 80	3 60
10	53 1/2	11 80	3 60
11	53 1/2	12 00	3 60
12	53 1/2	12 00	3 60
13	53 1/2	12 00	3 60
14	53 1/2	12 00	3 60
15	53 1/2	12 00	3 60
16	53 1/2	12 00	3 60
17	53 1/2	12 00	3 60
18	53 1/2	12 00	3 60
19	53 1/2	12 00	3 60
20	53 1/2	12 00	3 60
21	53 1/2	12 00	3 60
22	53 1/2	12 00	3 60

The market has lapsed into a quiet state. Orders are moderate, and the disposition is to buy at current rates only as necessities demand.

The United States Assay Office in New York reports the total receipts of silver at 157,500 oz. for the two weeks ending June 18.

COPPER.

The demand has continued rather poor and some of the producers evidently became tired of waiting, with the result that rather lower prices have again been accepted for all descriptions of copper. While some of the larger Lake companies are still holding out for 12c.

For electrolytic copper we have to reduce to 11.35@11.45c. for cakes, wire bars or ingots, and 11.15@11.25c. for cathodes.

LEAD

A very active business has been done at gradually rising prices. Very little

lead could be obtainable for either prompt or future shipment, and under the circumstances the market closes at its best with a very strong tendency at 3.90c. New York. In the West also a large business was done, and sales are reported in St. Louis at 3.77 1/2c.

SPELTER

The good consumptive demand continues and the market is rather firm at 4.450c., St. Louis, and 4.75c. New York. Spot spelter is rather scarce, and refiners have great difficulty at present in meeting their obligations.

ANTIMONY.

Antimony continues strong, and we quote Cookson's 98c.; Hallett's, U. S. Star and Japanese, 97c.

NICKEL.

Business still continues on unchanged lines and no alteration in prices can be reported. We quote for New York ton lots 33 1/2c. and 38c. per lb. and for smaller orders 35 1/2c. and 38c.

TIN

Prices in New York are, if anything, just slightly below the price at which tin can be laid down on this side. We have to quote for both spot and futures 15 1/2 @ 15 3/4.

PLATINUM.

Prices are now quoted at \$15 and \$16 per oz., New York. The London quotations are 58 @ 60 s per oz. Supplies are not large and prices are firm. For chemical ware, best hammered metal, Messrs. Eimer & Amend of New York furnish the following quotations: In lots of 250 grams or more, 56c. per gram; in lots of 100 grams or more, 57c. per gram; less than 100 grams, 58c. per gram; unman-

ufactured platinum will be supplied in same quantities at 2c. less per gram.

POTASSIUM CYANIDE

Purified, 98@99 per cent., in cases of 12 lb. at 32c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

QUICKSILVER.

The New York quotation are at \$43.00 per flask.

The London price is £7. 12s. 6d. per flask.

POWDER.

The market at San Francisco is fine with the current quotations.

The quotations are as follows: For Hercules No. 1, from 11 1/4c. to 17 1/4c., according to strength and quantity. No. 2, from 9c. to 11c., according to strength and quantity.

COKE.

The coke market has been quite dull the past week, and entirely without features of interest.

IN CAR LOTS, ST. LOUIS

Connellville 84 coke 72-hr. Fry \$1 85
New River, \$4 00 Pocahontas 1 00
Crushed, 1 85
Gas works coke, lump, per bushel 10

BORAX.

The San Francisco market in Borax is firm with a good demand.

The market is quoted as follows:
Refined, in carload lots, in barrels, 7 1/4
Refined, in carload lots in sacks, 7
Powdered, in car lots, 7 1/4
Concentrated, in car lots, 6 1/2

THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum:
No. 1, 98 per cent. ingots, per lb. 3 3/4c.
No. 2, 90 " " " " 3 1/2c.
Rolled sheets, per lb. 3 1/2c. up

Aluminum-Nickel, per lb. 10 1/2c.
Bismuth, per lb. 1 1/2c.
Phosphorus, per lb. 1 1/2c.
Tungsten, per lb. 1 1/2c.
Vanadium, 50 per cent. 1 1/2c.
Variations in price depend chiefly on the size of the order.

CHEMICALS

There has been no material change in demand for heavy goods.

Quotations generally are as follows:

CAUSTIC SODA.

Quotations for Caustic soda domestic high test are \$1.50 @ 1.55 per hundred lbs.

ALKALI.

Domestic, 58 percent., 55c. @ 60c., foreign 55c. @ 60c. from dock as to style of package.

CARBONATED SODA ASH.

58 per cent., 90c. and 95c. per 100 lbs. basis 48 per cent.

BI-CARBONATE OF SODA

English, \$2 12 1/2 @ \$2.25 per 100 lb. American, bulk \$1 25 and \$1.50 per 100 lbs. according to brand.

SALT SODA.

For domestic, 50c. per 100 lb., less usual discounts; English, 62 1/2c. and 65c. Concentrated salt-soda, \$1.60 @ \$1.65 per 100 lbs.

CHLORATE OF POTASH.

Chlorate of potash is quoted at \$11 and \$12 per 100 lbs.

CHLORIDE OF LIME

English prime brands \$1.75 @ \$1.95; ordinary, \$1.60 @ \$1.75; Continental, \$1.55 @ \$1.60; and French \$1.35 per 100 lbs.

Acids.

The market for the following acids lacks interest; has practically been at a standstill, through prices are pretty steady.

LEHIGH UNIVERSITY

South Bethlehem, Pa.

THOMAS MISSINGER DROWS, LL.D., Pres.

Courses in Civil, Mechanical, Electrical and Mining Engineering, Metallurgy and Chemistry. Also Classical and Literary Courses. For further information, and for Register, address, The Secretary of Lehigh University, South Bethlehem, Pa.

SAVE MONEY! FUEL COSTS MONEY



Protect your pipes and boilers with Wm. Berckfeld's Fogel meal composition, packed in sacks, easy to transport anywhere. Send for facts and figure.

FOGEL MEAL CO., 2 Cedar Street, New York

Wm. T. SMITH

"Photo Shows 313"

JAMES IRVING

SMITH & IRVING,

(FORMERLY, W. T. SMITH & CO.)

Gold Refiners and Assayers.

Our silver amalgam for replating copper plates is being extensively used by millmen. It avoids the necessity of sending plates long distances to be replated. For sale in small quantities, 50c per ounce, a reduction being made on all orders over 50 ounces. Experience proves our silver amalgam will catch more gold than when the copper is electroplated. Our Mr. Smith owned and operated Smelting, Refining and Chemical works in Providence, R. I., for over 20 years.

128 N. Main Street Los Angeles, Cal.

BELTING Leather, * ALSO Lace Leather
Cotton, Rawhide, etc.

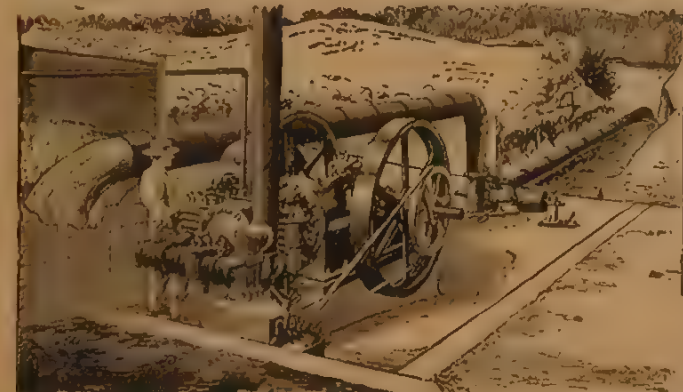
L. P. DEGEN, Manuf'r

Agent for Rubber Belting, Hose and Packing. 105 and 107 Mission Street, San Francisco, Cal.

PERFORATED SCREENS

Steel Plate, Copper and Bronze

For all uses. Send for Catalogue
A. J. BECKLEY & CO.
Works Garwood, N. J.



LARGEST GASOLINE PUMPING PLANT IN THE WORLD

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works at the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 800 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 210 Bay St., San Francisco.

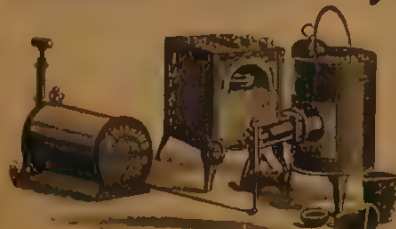
Hoskins' Patent Hydro-Carbon

Blow-Pipe and Assay Furnaces

No dust. No ashes. Cheap, effective, economical, portable and automatic. Send for Price-list to

Wm. HOSKINS,

81 South Clark St., Room 57
CHICAGO, ILL.



J. H. MASTERS,

Manufacturer of and Dealer in

Ore Sacks, Tents & Camp

Furnishings

217 Commercial St.,
LOS ANGELES, CAL.

≡ ADVERTISE IN THE JOURNAL ≡

Prices are per 100 lbs. in New York and vicinity in lots of 25 carboys or over. Quotations are as follows: Acetic acid, commercial No. 8 \$1.40 @ \$1.55, redistilled, 28 per cent., \$2.00 @ \$2.15. Muratic acid, 18 per cent., 1.10 @ \$1.75, 20° \$1.20 @ \$1.87½, 22° \$1.35 @ \$2.25, according to make and quantity. Nitric acid, 36°, \$4.50 @ \$4.75, 38°, \$3.75 @ \$4.62½, 40° \$4.00 @ \$4.75, 42°, \$4.02½ @ \$4.25. Oxalic acid, \$6.50 @ \$7.00. Mixed acids, according to mixture. Sulphuric acid, 66 per cent., \$1.10 @ \$1.75. Chamber acid, 50° \$11.50 @ \$12 per ton at factory. Blue Vitriol, \$3.62½ @ \$4.12½, according to grade and order.

BRIMSTONE

Demand continues moderate. No arrivals are noted, and prices are: Futures lower and the quotations for cargoes to arrive is \$24 per ton and for best un-mixed seconds with \$21.50 named for thirds.

NITRATE OF POTASH.

We quote per 100 lbs. on basis of 80 per cent., as follows: New York and Boston, \$1.78 for 80°/85 per cent., and \$1.81c. for 95 per cent.; Norfolk and Philadelphia, \$1.76½ for 80°/85 per cent., and \$1.79½ for 95 per cent.; Charleston, Savannah, Wilmington, N. C. and New Orleans, \$1.78½ for 80°/85 per cent., and \$1.81½ for 95 per cent. All for lots of 50 tons and upward.

KAMIT.

Invoice weights as taken at port of shipment per ton of 2,240 lbs. testing 12.4 per cent. actual potash, equivalent to 23 per cent. sulphate of potash, \$8.55 @ \$8.80 for New York and Boston; \$8.90 @ \$9.15 for Norfolk, and Philadelphia; and \$9.05 @ \$9.30 for Charleston. Sa-

vannah, Wilmington, N. C., and New Orleans.

NITRATE OF SODA.

Prices continue a little uncertain, with rather a downward tendency. The quotations are unchanged at \$1.87½ @ \$1.90 per 100 lbs. for spot, \$1.77½ for July arrivals, \$1.70 for August, \$1.65 @ \$1.67½ for September, and \$1.62½ @ \$1.65 for October-December, inclusive.

FINANCIAL NOTES.

The statement of the United States Treasury, on Thursday, May 26th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	June 16	Changes
Gold	\$1,013,501 D	\$2,500 D
Silver	2,227,773 D	3,200 D
Legal Tenders	222,773 D	100 D
Treasury Notes, etc.	1,222,773 D	800 D

Totals \$4,500,000 D \$2,500 D
Treasury deposits with national banks amounted to \$28,645,291, an increase of \$124,501 during this week.

Average Monthly Prices of Silver.

	1896	1897	1898
In New York per ounce Troy, from January 1st, 1896, and for the years 1896 and 1897			
Month	Cents	Cents	Cents
January	67.13	67.13	67.13
February	67.17	67.17	67.17
March	67.17	67.17	67.17
April	67.17	67.17	67.17
May	67.17	67.17	67.17
June	67.17	67.17	67.17
July	67.17	67.17	67.17
August	67.17	67.17	67.17
September	67.17	67.17	67.17
October	67.17	67.17	67.17
November	67.17	67.17	67.17
December	67.17	67.17	67.17
Year	67.17	67.17	67.17

Gold and Silver Exports and Imports.

At all United States ports, April, 1898, and years from January 1st, 1898 and 1897

	Com and Bullion Exp.	Imp.	In Ores Exp.	Imp.
Gold				
May	\$1,119,383	\$1,119,383	\$1,119,383	\$1,119,383
April	1,119,383	1,119,383	1,119,383	1,119,383
March	1,119,383	1,119,383	1,119,383	1,119,383
February	1,119,383	1,119,383	1,119,383	1,119,383
January	1,119,383	1,119,383	1,119,383	1,119,383
1898	1,119,383	1,119,383	1,119,383	1,119,383
1897	1,119,383	1,119,383	1,119,383	1,119,383

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

Specie shipments by water from San Francisco for the five months ending May 31st were as follows:

	Gold	Silver	Totals
Hong Kong	\$19,448	\$2,102,105	\$2,121,553
Shanghai	106,575	1,119,383	1,225,958
India	1,119,383	1,119,383	2,238,766
Hankow	1,119,383	1,119,383	2,238,766
Yokohama	1,119,383	1,119,383	2,238,766
Manila	1,119,383	1,119,383	2,238,766
Central America	1,119,383	1,119,383	2,238,766
Total foreign	\$2,121,553	\$2,844,105	\$4,965,658
New York	1,119,383	1,119,383	2,238,766
Totals	\$3,240,936	\$3,963,488	\$7,204,424
Totals 1897	1,119,383	1,119,383	2,238,766

The preliminary statement of the Bureau of Statistics of the Treasury Department shows that merchandise exports from the United States continued heavy in May, reaching a total of \$110,239,206, or \$32,367,930 more than in May, 1897. The imports for the month were \$53,258,847. For the eleven months of the fiscal year from July 1st to May 31st, the statement is as follows:

	1897	1898
Exports	\$97,406,522	\$110,239,206
Imports	\$69,849,701	\$53,258,847
Excess, exports	\$27,556,821	\$56,980,359
Add excess of exports, silver		73,654,841
Total		\$130,635,199
Deduct excess of imports, gold		1,225,958
Net apparent balance		\$129,409,241

POSITIONS WANTED

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month will be charged. Advertisements not accepted for less than one month.

WANTED, by a young experienced man, position as quartz mill man, one who can keep mill running.
Address, A. E. CHARLESWORTH, LOCKFORD, CAL.

WANTED, by a young man, a position as Assayer, etc.; experienced, competent and has a good knowledge of all metallurgical operations. Good references.
Address, T. K. JOURNAL OFFICE, Stimson Block, Los Angeles, Cal.

WANTED—An experienced Engineer with practical knowledge of management of dynamo and electric lights. Also wanted an Assayer with practical knowledge of silver metallurgy. Address with references
VEKOL MINING CO., Vekol, Arizona

FOR SALE!

I HAVE some good gold mining properties for sale at reasonable prices, some developed and some real good properties at Ward, Eldora, Gold Hill, Jamestown, Magnetite, Carbon and Sugar Loaf. Write stating what you want or call on me.
JAMES M. NORTH, Former County Judge, BOULDER, COLO

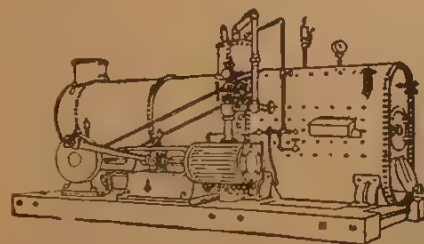


Assayers and Laboratory

Glassware and Porcelain Ware, Magnifying Glasses, Thermometers, Altitude Barometers, Compasses, and Microscopes, Wholesale and Retail. Correspondence Solicited. Prices quoted on application.

Pacific Optical Company,

245 S. Spring St., Los Angeles, Cal.

Engines
Boilers
Saw Mills

Write for Catalogue and Prices.

RUSSELL & CO. PORTLAND, OREGON.

ADOLF FRESE
ENGINEERING INSTRUMENTS

Barometers, Thermometers, Field Glasses, Microscopes and Accessories. Repairing Promptly Done.

126 S. Spring St., LOS ANGELES, CAL.

Oilless Bearings,



For

Rope Tramways, HOISTING
Engines, Tackle Blocks,
Cam Shafts in STAMP
MILLS.

A PRACTICAL BEARING THAT
RUNS WITHOUT OIL.
The Graphite
Lubricating Company

BOUND BROOK, N. J.

Sulphuric Acid

FOUNDRY

Mining Machinery

Iron and Brass Castings of all kinds, Shoes and Dies, Pumps, Engines, Boilers, Stamp Mills, etc., etc. Machinists and Foundrymen.

Standard Iron Works,
PHOENIX, . . . Arizona

A. F. JUDSON, E.M.

Geologist and Mining Engineer,

Mines Examined and Reported on.
COLTON, CALIFORNIA

A. A. WARREN

ASSAYER AND
ANALYTICAL CHEMIST

COLTON, - CALIFORNIA

Manufactured by the
Western Chemical Co. Denver, Col.
For Chlorination Refining and other
processes. Also Muriatic and Nitric
Acids, Blue Vitriol, Copperas, Reduced
Sulphate of Soda, Etc.

FOR SALE!

One 36"x84" Water Jacket Furnace, Boiler, Engine
Blower, Rock Breaker, Scales, Shafting, Pulleys, Belting,
Tools and all fittings and fixtures complete and new, built by
Frazer & Chalmers; also one 16x42 Hamilton Corliss Engine;
one 12x20 double Cylinder Hoisting Engine. Will be delivered f. o. b.

W. B. DAME, CERILLOS, NEW MEXICO

Chemist to the Board of Health of the City of
Spokane. All Assays guaranteed to check
with United States Mint.

E. B. VAN OSDEL, A. M.

Assayer and Analytical Chemist

Anything Analyzed.

109 Howard Street, Spokane, Washington

The Baker & Adamson Chemical Co.

MANUFACTURERS OF

Strictly Chemically Pure Acids and
Chemicals and Ashless Filter
Papers

EASTON, . . . PENNSYLVANIA

ASSAYERS AND CHEMISTS

WADE & WADE

Best and Oldest Establishment in Southern Cal.

115½ N. Main St., Los Angeles, Cal

THE JOHANNESBURG SAMPLING WORKS

Purchasers of Gold, Silver, Copper and Lead Ores and Concentrates

Cash Returns Made Within Twenty-four hours after receipt of Ore.

CHAS. R. WORGES, Manager,

Johannesburg, Cal.

MINING STOCK QUOTATIONS

BOSTON

Aetna Con.....	Do. rights.....	55
Alliance.....	Gold Coin.....	1 00
Anaconda.....	Humboldt.....	4 75
Arnold.....	Illinois Steel.....	60 00
Ash Red.....	Lake Sup Iron.....	—
Atlantic.....	Maced.....	—
Baltic.....	National.....	75
Bonanza.....	New Idria Mg.....	—
Boston and C C.....	Old Dominion.....	28 00
Boston & Mont.....	Oreola.....	55 75
Bull & Boston.....	Parrot.....	22 00
Calumet & Hecla.....	Pioneer.....	5 75
Calumet.....	Quincy.....	118 1/2
Centennial.....	San Yacbel.....	—
Dominion Coal.....	Lamarack.....	165 00
Dominion Pref.....	Leucureh.....	2 00
Franklin.....	Wolverine.....	23 00

NEW YORK

Alamo.....	Homestake.....	29 50
Alice.....	Iron Silver.....	—
Annetta.....	Mexican.....	70
Best & Belcher.....	Mollie Gibson.....	19
Bray Switch.....	Ontario.....	4 50
Buller.....	Opinion.....	—
Crown Point.....	Pharmacist.....	10
Con. Cal. & Va.....	Pinecroft.....	—
Cripple Creek Con.....	Quintanilla.....	3 00
Dealswood.....	Quintanilla pfd.....	11 00
Fax mine.....	Santa Nevada.....	—
Fortuna.....	Standard.....	1 50
Golden Fleece.....	Union Con.....	—
Gould & Curry.....	Yellow Jacket.....	—
Hale & Norcross.....	—	—

COLORADO SPRINGS STOCKS

Alamo.....	Jack Pot.....	03 1/2
Anaconda.....	Leighton.....	—
Argentum Juanita.....	Little.....	80
Rob Lee.....	Magnet R.....	003 1/2
Creede & C C.....	Marion.....	—
C C Consolidated.....	Minto.....	15
Des Moines.....	Mollie Gibson.....	24 1/2
Rikton Con.....	Moon-A.....	74 1/2
El Paso.....	Mount Rosa.....	12 1/2
Fanny R.....	New Haven.....	01 1/2
Payvite.....	Pharmacist.....	05
Finley.....	Pilgrim C.....	—
Franklin.....	Portland.....	88 1/2
Golden Crater.....	Pr. Albert.....	01 1/2

Golden Fleece.....	30	Sp. Union.....	—
Gold & Globe.....	—	Trachyte.....	00 1/2
Jayden.....	005	Union Gold.....	01 1/2
Ing. Con.....	005	Work.....	02 1/2
Isabella.....	235	—	—

LOS ANGELES, CAL.

Amargosa.....	05	Lucky Star.....	0 00
Brown Lake.....	07 1/2	Magnolia.....	—
East Amargosa.....	50	Mohawk Action.....	07
Empire Copper.....	25	Old Dominion.....	60
Gold Bug.....	1 00	Paid Con.....	1 25
Grand Central.....	02	Rand Mt.....	1 25
Iron Mt.....	02	Sun Prince.....	1 50
Leucureh.....	02 1/2	Val Verde.....	09 1/2
Little Butte.....	15	Wedge.....	—

SAN FRANCISCO

Alpha.....	—	Rechequer.....	—
Alta Con.....	10	Gould & Curry.....	21
Andes.....	09	Hale & Norcross.....	1 55
Belcher.....	23	Juana.....	55
Best & Belcher.....	27	Mexican.....	60
Bodie.....	—	Opinion.....	—
Dillon.....	—	Oxman.....	—
Challenge.....	26	Potosi.....	21
Chollar.....	15	Savage.....	10
Confidence.....	85	Sierra Nevada.....	67
Con. Cal. & Va.....	49	Union Con.....	11
Con New York.....	—	Utah.....	07
Crown Point.....	13	Yellow Jacket.....	08

SALT LAKE CITY

Alice.....	90	Lucky Hill.....	—
Ajax.....	31	Malvern.....	—
Alliance.....	10	Mammoth.....	1 57 1/2
Anchor.....	80	Maxfield.....	7 00
Buckeye.....	01 1/2	Mercer.....	—
Bull, Beck.....	5 75	Morgan.....	—
Cent Eureka.....	30 00	Northern Light.....	86
Chloride Point.....	91 1/2	Omaha.....	28
Dalton.....	03 1/2	Ontario.....	3 15
Daly.....	50	Overland.....	90
Daly West.....	3 50	Richmond Ana.....	02 1/2
Dalton & Lark.....	01 1/2	Conda.....	15
Dexter.....	1 02 1/2	River.....	—
Eagle.....	05 1/2	Sacramento.....	64
Eureka Hill.....	—	Silver King.....	18 75
Pour Acon.....	07	Klous Con.....	10
Galena.....	50	Sunbeam.....	28
Gen. Cal.....	—	Sunshine.....	28
Geysers-Marion.....	86	Swansea.....	2 42 1/2
Grand Central.....	6 85 1/2	Swansea.....	1 25
Homestake.....	01 1/2	Utah.....	50
Horn Silver.....	1 25	Utah Con.....	—
Little Pittsburg.....	02 1/2	—	—

ROSSLAND, BRITISH COLUMBIA

Alberta.....	05	Joel Mac.....	12 1/2
B. C. Gold King.....	07	Joel.....	36
Beaver.....	10	Jumbo.....	75
Big Three.....	10	Knight Templar.....	15
Blackbird.....	07	Kootenay London.....	19
Brace.....	10	Le Roi.....	08 00
Butte.....	01 1/2	Lilly May.....	18
Caledonia Con.....	05 1/2	Mabel.....	15
California.....	15	Mayflower.....	15
Comp Bird.....	05	Monita.....	15
Celtic Queen.....	05	Monte Christo.....	13 1/2
Centre Star.....	24	Mugwump.....	08
Colonna.....	18	Nest Egg.....	05
Commander.....	12 1/2	Northern Belle.....	19
Deer Park.....	32	Nocty.....	19
Delta Colla.....	12	O. K.....	19
Delaware.....	20	Palo Alto.....	05
Eastern Star.....	20	Phoenix.....	13 1/2
Enterprise.....	03 1/2	Poorman.....	15
Evangelist.....	05 1/2	R. Lee.....	15
Georgia.....	10 1/2	Red Mount View.....	05
Gettysburg.....	10 1/2	Red Point.....	10
Golden Drip.....	15	Road's H'mest'ke.....	25
Good Hope.....	03 1/2	Roadland, Red Mt.....	05
Grand Erie.....	03 1/2	St. Klous.....	05
Great Western.....	08	St. Paul.....	12 1/2
Hattie Brown.....	—	Silver Bell.....	04
Helen.....	04	Silverline.....	05
High Ore.....	04 1/2	So. Cross & W. Con.....	20
Imperial.....	10	Virginia.....	12
Iron Horse.....	20	War Eagle Con.....	1 00
Iron Mask.....	38	West Lee Rot.....	11
I. X. L.....	10	White Bear.....	11

DENVER STOCK REPORT.

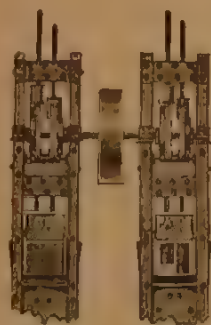
Aetna.....	001 1/2	Keystone.....	01
Anaconda.....	51	Little.....	70
Arcadia.....	00 1/2	Moon A.....	50
Argentum Juanita.....	25	St. Rosa.....	12 1/2
Banner.....	07	Old Gold.....	05 1/2
Bob Lee.....	002 1/2	Peoples.....	01 1/2
C C Con.....	003 1/2	Pilgrim C.....	002 1/2
Elkton.....	30 1/2	Pine Creek.....	002 1/2
El Paso C.....	05 1/2	Portland.....	01 1/2
Enterprise.....	02 1/2	Prince Albert.....	01 1/2
Garfield Grouse.....	05	Republic.....	02 1/2
Geo. Washington.....	003 1/2	Sacramento.....	02 1/2
Golden Eagle.....	34	Specimen.....	03 1/2
Gold Coin.....	88	Tamarack.....	004 1/2
Gilpin & C.....	08 1/2	Union Gold.....	10 1/2
Gilpin Four.....	004 1/2	Virginia M.....	03 1/2

Iron Ore.....	02 1/2	Stock of Linton.....	002 1/2
Isabella.....	25 1/2	Var.....	02 1/2
Jack Pot.....	00 1/2	—	—

MEXICO

Name of Company	State	Price
Allanza.....	Hidalgo.....	5
Anastasio y Compania.....	Guerrero.....	210
Arcadia.....	Hidalgo.....	230
Arcadia y Anexa.....	Guerrero.....	250
Arcadia y Anexa.....	Guerrero.....	300
Barrios y Cabras.....	Hidalgo.....	100
Barrios y Cabras.....	Hidalgo.....	20
Candelaria de Placer.....	Hidalgo.....	150
Candelaria de Placer.....	Hidalgo.....	20
Candelaria de Placer.....	Hidalgo.....	30
Capitania.....	Durango.....	120
Carmen.....	Hidalgo.....	350
Cerro de San Juan.....	Hidalgo.....	80
Cerro Colorado.....	Hidalgo.....	10
Cerro Colorado.....	Hidalgo.....	650
Cerro Colorado.....	Hidalgo.....	250
Cerro Colorado.....	Hidalgo.....	1 300
Cerro Colorado.....	Hidalgo.....	180
Cerro Colorado.....	Hidalgo.....	100
Cerro Colorado.....	Hidalgo.....	40
Cerro Colorado.....	Hidalgo.....	200
Cerro Colorado.....	Hidalgo.....	150
Cerro Colorado.....	Hidalgo.....	50
Cerro Colorado.....	Hidalgo.....	270
Cerro Colorado.....	Hidalgo.....	180
Cerro Colorado.....	Hidalgo.....	925
Cerro Colorado.....	Hidalgo.....	100
Cerro Colorado.....	Hidalgo.....	20
Cerro Colorado.....	Hidalgo.....	730
Cerro Colorado.....	Hidalgo.....	80
Cerro Colorado.....	Hidalgo.....	100
Cerro Colorado.....	Hidalgo.....	250
Cerro Colorado.....	Hidalgo.....	40
Cerro Colorado.....	Hidalgo.....	27
Cerro Colorado.....	Hidalgo.....	280
Cerro Colorado.....	Hidalgo.....	15
Cerro Colorado.....	Hidalgo.....	100
Cerro Colorado.....	Hidalgo.....	15
Cerro Colorado.....	Hidalgo.....	100

NOTE—The above Mexican stocks are figured on the basis of Mexican silver



Krogh Manufacturing Company

Successor to San Francisco Tool Co.'s Machine & Mill Dept.
MANUFACTURERS OF AND DEALERS IN

MINING AND PUMPING MACHINERY,

COMPRISING

Briggs' 2-Stamp Triple-Discharge Quartz Mill, of Latest Improved pattern, Rock Breakers, Ore Feeders, Concentrators, Engines and Boilers, Hoisting Rigs to be operated by Horse, Steam Power or any other motor; Ore Cars and Ore Buckets, Cornish and Jack-head Pumps, Triple-Acting Pumps, Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process, Pipe and Gate Valves, Link Chain Elevators for elevating and conveying all kinds of material. Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

OFFICE AND WORKS AT

51 Beale St. and 9 to 17 Stevenson St.,

San Francisco, Cal.

Chas. P. Grimwood,

Mining Engineer and Metallurgist

Laboratory, 214 Pine Street,

SAN FRANCISCO, CAL.

Assay Office *

LEW E. AUBURY

115 W. First St.,

Opp. Nat'l House

Los Angeles



BRANCH OFFICES

1128 E. St.,

SAN DIEGO, CAL.

523 1st AVENUE,

SPOKANE, WASH.

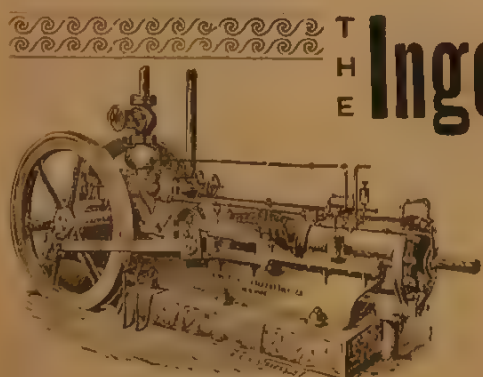
The Southern California Lumber Co., Stimson Bldg., Los Angeles, Cal., Chas. Wier Manager, sec

LUMBER

At Wholesale Prices

Mining Timbers a Specialty

Write for Prices



AIR COMPRESSOR

THE Ingersoll-Sergeant Co.,

Rock Drills

AND Air Compressors

MODERN, DURABLE AND
GUARANTEED to do the Work.

Write for Full Particulars

26 Cortlandt Street,

New York City

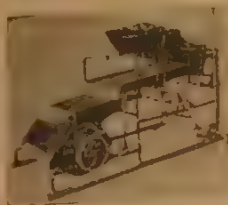


ROCK DRILLING

INCORPORATED MINES PAYING DIVIDENDS.

NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Mineral Produced
Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Sept 1897	\$ 110,000	Q.
Ajax	Utah	300,000	3,000,000	10			1,000,000	G, C, S, L.
Alaska, Treadwell	Alaska	200,000	5,000,000	25	35	October, 1897.	3,250,000	G.
Alaska Mexican	Alaska	200,000	1,000,000	5	10	Oct., 1897	297,031	G.
Alice	Montana	400,000	10,000,000	25	03	Oct 1897	1,055,000	G.
Alice	Utah	400,000	10,000,000	25	05	April 1898	1,075,000	S, L, G.
Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1897	3,750,000	C.
Anchoria Island	Colorado	600,000	600,000	1	01	Oct 1897	84,000	G.
American Gold	Colorado	800,000	3,000,000	10	02	Aug 1897	273,000	G, S, L.
Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1897	740,000	S.
Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	512,500	G, C, S.
Bangkok C-Bell	Colorado	600,000	600,100	1	01	July 1896	107,510	S, L, C.
Big Six	Colorado	500,000	500,000	1	00 1/2	April 1897	5,000	G, S.
Boston & Montana	Montana	150,000	3,750,000	25	3 00	Aug 1897	6,275,000	G, C, S.
Bullion Beck and Champion	Utah	100,000	1,000,000	10	50	Mar 1897	2,485,000	G.
Bunker Hill and S	Idaho	300,000	3,000,000	10	05	Oct 1897	324,000	S, L.
Cariboo	British Col	8 0,000	800,000	1	02	May 1897	156,065	G.
C. O. D.	Colorado	50,000	500,000	1	01	March 1896	25,000	G.
Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Oct. 1897	50,850,000	C.
Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010,000	S, L.
Central Lead	Missouri	4,000	400,000	100	1 00	Oct 1897	16,000	L.
Charleston	South Car	10,000	1,000,000	100	1 00	Feb 1897	150,000	
Champion	California	34,000	340,000	10	25	Aug 1897	278,200	G.
Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G, S.
Crescent	Utah	24,000	600,000	25		July 1897	280,000	
Daly	Utah	150,000	3,000,000	20	25	Mar 1897	2,925,000	S, L.
Deadwood Terra	Dakota	200,000	5,000,000	25	40	June 1897	1,320,000	G.
De Lamar	Idaho	400,000	2,000,000	5	25	Jan 1897	2,250,100	S, L.
Della S	Colorado	1,000,000	1,000,000	1	10	Jan 1897	60,000	G.
Doe Run	Missouri	5,000	500,000	100	50	October 1897		L.
Dalton and Lark	Utah	2,500,000	2,500,000	1	00 1/2	August 1896	87,500	S, L.
Elkton Consolidated	Colorado	1,250,000	1,250,000	1	03	Sept 1897	361,960	G, S.
El Paso	Colorado	650,000	650,000	1	01	Aug 1897	5,393	G, S.
Eureka Hill	Utah	10,000	1,000,000	100		1897	1,650,000	
Florence	Montana	500,000	2,500,000	5	01	May 1897	132,530	S.
Galena	Utah	100,000	1,000,000	10	05	Jan. 1897	71,000	G, S, L.
Garfield Grouse	Colorado	1,200,000	1,200,000	1	01	Feb. 1897	24,000	G.
Gemini	Utah	5,000	500,000	100		1897	500,000	
Geyser-Marion	Utah	300,000	1,500,000	5	02	May 1898	84,000	G.
Golden Eagle	Colorado	1,000,000	1,000,000	1	01	Sep. 1896	10,000	G.
Golden Fleece	Colorado	600,000	600,000	1	01	Feb. 1897	569,179	G, S.
Gold Coin	Colorado	200,000	1,000,000	5	05	Aug 1897	150,000	G, S.
Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	51,625	G.
Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	G, C, S, L.
Helena & Frisco	Idaho	500,000	2,500,000	5	01	August 1896	475,000	S, L.
Highland	S. Dakota	100,000	10,000,000	100	20	Oct 1897	3,424,978	G.
Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1897	18,000	G.
Homestake	Dakota	125,000	12,500,000	100	25	Oct 1897	6,431,250	G.
Hope	Montana	100,000	1,000,000	10	10	Nov 1897	732,252	S.
Horn Silver	Utah	400,000	10,000,000	25	05	April 1898	5,120,000	S, L.
Idaho	Brit. Col	500,000	500,000	1	05	Mar 1897	152,000	
Iowa	Colorado	1,000,000	1,000,000	1	00 1/2	Oct 1897	65,000	G.
Iron Mountain	Montana	500,000	5,000,000	10	01	Sept 1897	497,500	S.
Isabella	Colorado	2,250,000	225,000	100	00 1/2	June 1897	270,000	G.
Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
Last Chance	Brit. Col	500,000	500,000	1	04	Jan 1897	42,000	S, L.
Le Roi	British Col	500,000	2,500,000	5	10	Oct 1897	625,000	G.
Minnesota	Minnesota	165,000	16,500,000	100	1 50	July 1896	3,240,000	L.
Montana Ore Purchasing	Montana	40,000	1,000,000	25	01	October 1897	610,000	
Morning Star	California	2,400	240,000	100	8 00 1/2	Sept. 1897	558,800	G.
Mt. Rosa	Colorado	1,000,000	1,000,000	1	00 1/2	Oct. 1896	30,000	G.
Mercur	Utah	200,000	5,000,000	25	18	May 1898	1,068,000	G.
Mammoth	Utah	400,000	10,000,000	25	05	June 1898	1,250,000	G, S, C, L.
Moon Anchor Gold	Colorado	600,000	600,000	1	02	Nov 1897	63,000	G.
New Elkhorn	Colorado	300,000	1,500,000	5	24	Sep. 1896	72,000	G.
New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Oct. 1897	832,500	S, G.
Napa	California	100,000	700,000	7	20	Oct 1897	870,000	Q.
New Idria Quicksilver	California	100,000	500,000	5	10	Sept 1897	20,000	Q.
Ontario	Utah	150,000	15,000,000	100	75	Dec 1897	13,542,500	S, L.
Osoeca	Michigan	50,000	1,250,000	25	1 00	June 1897	2,172,500	C.
Parrot	Montana	230,000	2,300,000	10	06	June 1897	1,656,122	C.
Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Sept 1897	20,750	
Portland	Colorado	3,000,000	3,000,000	1	01 1/2	Oct 1897	1,163,000	G, S.
Princess	Colorado	1,000,000	1,000,000	1	00	Feb 1897	45,000	G.
Quincy	Idaho	100,000	2,500,000	25	4 00	August 1897	9,470,000	C.
Rambler-Cariboo	Brit. Col	1,000,000	1,000,000	1	02	April 1897	40,000	
Reco	Brit. Col	1,000,000	1,000,000	1	50 1/2	May 1897	187,500	S, L.
Sacramento	Utah	1,000,000	5,000,000	5	00 1/2	June 1898	35,000	G.
Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Mar 1896	3,275,000	S.
South Swansea	Utah	150,000	150,000	1	05	April 1898	90,000	S, L.
Standard	California	200,000	20,000,000	100	10	Sept 1897	3,757,888	G, S.
St. Joseph	Missouri	250,000	2,500,000	10	15	Oct 1897	21,000	L.
Silver King	Utah	150,000	3,000,000	20	25	June 1898	1,575,000	S, L, G.
Slocan Star	Brit. Col	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	
Smuggler Union	Colorado	50,000	5,000,000	100	1.00	Oct 1896	150,000	G, S.
Swansea	Utah	100,000	500,000	5	05	June 1898	100,000	S, L.
Tom Boy	Colorado	200,000	2,000,000	10	20	March 1890	410,000	G.
Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1897	4,950,000	C.
Union	Colorado	1,250,000	1,250,000	1	01	June 1896	73,000	S.
Utah	Utah	100,000	1,000,000	20	01	Dec. 1897	177,000	G, S.
Utah Consolidated	Utah	30,000	150,000	5	02	Sept 1896	30,000	S, L.
Victor	Colorado	200,000	1,000,000	5	10	March 1897	765,000	G.
Western Mine Enterprise	Montana	500,000	500,000	1	10	Mar 1897	12,000	
War Eagle	British Col	500,000	500,000	1	06	October 1896	187,000	

S, Silver. G, Gold. L, Lead. O, Copper. Q, Quicksilver. I, Iron. B, Borax.

**KLONDIKE MACHINE.**

If you are going to the Klondike or any other country to placer mining you cannot afford to be without one of our placer machines. It will work any class of placer ground, river or sea sands. It will make a clean saving of the fine float gold as well as the coarse. The material is separated into four different grades in passing through the machine, a coarse screen is arranged over the hopper to cut out the rocks and gravel; it is fed regularly on to the screen below; a series of riffles are arranged at the end of this screen to catch any coarse gold that will not pass through the screen, the material then passes over the riffle table (steel hungarian riffles) on to the screen over the amalgamating plate and cylinder, this fine screen cuts out all the coarse gauge allowing nothing but the water and fine material to pass through the Amalgamator, this avoids any scouring whatever. The riffle table and hopper has an end shake moving both together, can be set at any pitch, each separately, can be run fast or slow to suit the work being done, this machine is just the machine for dry countries, as it requires very little water. By attaching one of our pumps the water can be used over and a large amount of work can be done with a small amount of water, the pump will lift water 20 feet from a stream or well. As a gold saver this machine has no equal, it is light, simple, and durable, can be packed, the heaviest piece weighing 50 pounds, built almost entirely of metal, three sizes, price \$150, \$300, \$450, capacity 10, 25 and 40 tons, weight, 175, 400, and 550 pounds. Send for full descriptions

PACIFIC MINING MACHINERY CO.
129 First St., San Francisco, Cal.

**The Pulsometer Steam Pump**

"THE MINER'S FRIEND"
Often Imitated--Never Equaled Over 20,000 In Use

RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining Quarrying, Railroad, Irrigation, Drainage, Coal Washing, Tank-filling and for Pumping Back Liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump

AGENTS

PARK & LACY CO., A. M. HOLYER BROS. CO., MITCHELL-LEWIS & STAYER CO.
San Francisco, Cal. Helena, Mont. Portland, Oregon.

Pulsometer Steam Pump Co.

133 Greenwich Street, New York City

The Bleichert Wire Rope Tramway

And Other Systems of Aerial Transportation



Bleichert Tramway of the Solvay Process Co. transporting rock

MANUFACTURED BY **THE TRENTON IRON CO., TRENTON, N. J.**
Engineers and Contractors and sole licensees in North America for the Bleichert System. Also Wire Rope Equipments for Surface and Underground Haulage, etc.
NEWTON A. BELL, Agent, 190 California St., San Francisco, Cal.

JOHN. T. REED**Assayer and Analytical Chemist**

Assays made for all valuable metals. Analysis made of all valuable minerals. Special attention given to the sampling of mines. Estimating the value of and testing the nature of their ores. 100 pound lots of ore sampled, and working tests made by Cyanide, Amalgamation and Chlorination Processes.

OFFICE 522 COURT STREET,

San Bernardino, - - California

**Third Edition Revised and Enlarged
Prospector's Field Book and Guide**

In the search for and the easy determination of ores and other useful minerals, by H. S. Ashcroft 68 engravings 274 pages, by mail \$1.50

Catalogue M, Mining, Assaying, etc., sent free

PHILADELPHIA BOOK CO.

15 S. Ninth Street, Philadelphia, Pa.

**E. E. BURLINGAME'S
ASSAY OFFICE**

Established in Colorado, 1866. Samples by mail or express will receive prompt and careful attention. Gold and Silver Bullion refined, melted and assayed, or purchased.

Address 1736 and 1738 Lawrence St., Denver, Col.

HENRY RIVES ELLIS**Mining Engineer and Metallurgist**

Ores Sampled, Assayed and Analyzed. Practical working tests by Stamp, Pan and all Processes.

Assay Office and Metallurgical Works,
318 PINE STREET, SAN FRANCISCO, CAL.

Established 1872.
F. E. BRANDIS, SONS & CO.
ENGINEERING
INSTRUMENTS
FOR ALL PURPOSES.
312-314 GATES AVE., BROOKLYN, N. Y.
Catalogues mailed on application.

Published by **Mathew Carey**,
HENRY CAREY BAIRD & CO.,
Industrial Publishers, Booksellers and Importers
810 Walnut St., Philadelphia, Pa., U.S.A.
Our new and revised *Catalogue of Practical and Scientific Books* 32 pages, 3vo, complete to February 1, 1899, and our other catalogues and Circulars, the whole covering every branch of Science applied to the Arts, sent free of postage on any one in any part of the world who will furnish his address.

Preach at 'Em!

If you want the Miners of North and South America to know you are on earth, you've got to "Preach at 'em."

The Mining and Metallurgical Journal

is the best medium to use--do all your preaching in it, and miners all over the world will listen to you.

OFFICES:

Stimson Block, Los Angeles and

64 Merchants' Exchange,
San Francisco, Cal.

CLEANED WITHOUT ALTERING ADJUSTMENT
THE LEVER RULING PEN
SEND FOR DESCRIPTIVE CIRCULAR.
THEO. ALTENEDEK & SONS, PHILADELPHIA

MINERALS WANTED

Gold and Silver Quartz Specimens, Crystals, Opals, Turquoise, etc., etc.

Buy in Any Quantities Pay good prices Cash

E. C. MOLLER,

538 EAST 86th STREET,

NEW YORK

Dividend Paying and Investment Mining Stock

W. E. HUBBARD & CO.,

Tel. 505

15 W. 2d South St., Salt Lake City, Utah

CALDWELL BROS.

Tacoma and Seattle, Wash.

MANUFACTURERS AGENTS

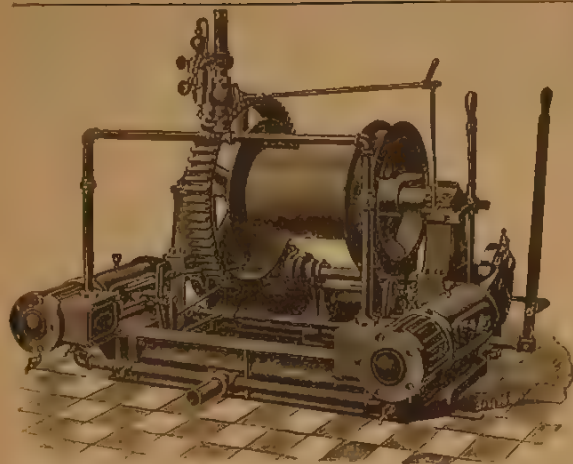
AND DEALERS IN

MACHINERY and MINE SUPPLIES

We carry a Very Large and Complete Stock



It Will Pay You to Write Us for Quotations



BAKER & HAMILTON,

HIGH GRADE

Engines, Boilers, Ice Machines, Mining Tools, Etc., Etc.

THIS CUT represents one of our improved DOUBLE STEAM HOISTING ENGINES. We have them in sizes from 12 H. P. up (with or without boilers). They are constructed with the greatest care by engineers familiar with the best previous practice. They come with sectional iron frames, reversible link motions, etc.; consequently can be shipped knocked down, in pieces suitable for transportation over difficult roads and trails.

We also have them with the Single Engines from 6 H. P. up; Boiler and Engine contained on same frame.

Write for Prices; They Will Interest You.

SAN FRANCISCO, CAL.

BRANCH HOUSES:
Sacramento and Los Angeles.

FACTORY:
Benicia, California

Expense

In the operation of Mines
is reduced by using our

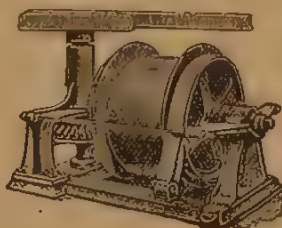
Car Wheels.

Price and wearing qualities
reduce the expense.

Globe Iron Works
STOCKTON, CAL.

WRITE FOR PRICES.

EL PASO AUTOMATIC HORSE WHIM



This is the latest improved horse power hoist offered prospectors, possessing all the best features of other styles with improvements added. The end thrust is entirely done away with, thus increasing the efficiency and saving considerable wear. The automatic safety break is so arranged that accident is impossible, being in position until held out by operator to lower bucket. It is made entirely of iron and steel. Weight, about 1,200 pounds. Heaviest single piece, 275 pounds. Price, f.o.b. Colorado Springs, \$50. Cars, Buckets, Rope, Rails, etc.; The Climax Engines. Manufactured by

The Russell Iron Works Co.,
COLORADO SPRINGS, COLO., U. S. A.

UNION HARDWARE AND METAL CO.

DEALERS IN—

Boiler Tubes, Iron Pipe and Fittings

RAILROAD, MILLING, MINING and FOUNDRY SUPPLIES

14 and 216 N. Los Angeles Street

Los Angeles, Cal.

Assaying in all its Branches.

Determinations Accurately Made



The Bi-Metallic ...

Assay Office

and Chemical Laboratory

R. A. PEREZ, E. M., Manager

Formerly Chief Assayer in El Paso Smelting Works, El Paso, Texas; Assistant Chemist Consolidated Kansas City Smelting and Refining Co., Argentine, Kansas.

124 South Main Street,

Los Angeles, Cal.

IMPERIAL

(Trade Mark)

BOILER COMPOUNDS

For the Prevention and Removal of Scale—in Steam Boilers.

Please mail us a specimen of your Boiler Scale which we will analyze for you Free of Charge and prepare a compound for your special case, and guarantee satisfactory results

ESTABLISHED 1876

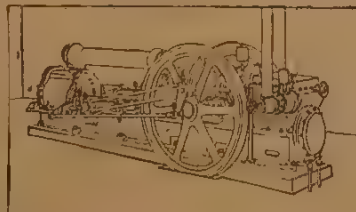
IMPERIAL CHEMICAL CO.,

Indispensable to Mining and Mill Men
Office and Laboratory,
322 N. American Street, Philadelphia, Pa.

NORWALK IRON WORKS CO.

SOUTH NORWALK, CONNECTICUT.

THE NORWALK AIR and GAS COMPRESSOR



In use in every State in the Union, Central America, and South America, Great Britain, etc., Also used by the U. S. Army and Navy.

Especially Designed for
Driving

ROCK DRILLS,
PNEUMATIC LOCOMOTIVES,
ENGINES, PUMPS
COAL CUTTERS.

And Other Mining Machinery. The Best Machine for Compressing Air for all Dynamic Purposes. Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO., Agents San Francisco

STEEL CASTINGS

From 1 to 40,000 pounds weight

Of Open Hearth or Chester Steel. True to Pattern, Sound, Solid. Gearing of all kinds and Crank Shafts. Shoes, Dies, Crusher Plates, Bosses, Tappets and Roll Shafts. Steel Castings of every description.

Chester Steel Castings Co.,
Works, Chester, Pa., Office, Liberty St. Phila., Pa.



Randsburg Gold Fields

VIA

Santa Fe Route

Leave Los Angeles, 8:50 a. m.
Leave San Bernardino 12:10 p. m.
Arrive Barstow 3:15 p. m.
Leave Barstow 3:55 p. m.
Arrive Kramer 5:05 p. m.
Arrive St. Elmo, 8:25 p. m.
Arrive Johannesburg 8:50 p. m.

Returning Trains Leave
Johannesburg 9:00 p. m.
Arrive San Bernardino 5:35 a. m.
Arrive Los Angeles, 8:25 a. m.

A through passenger coach is run between Barstow and Johannesburg.

Through tickets and particulars of any Santa Fe Route Agent.

SAN FRANCISCO OFFICE
644 MARKET ST.

LOS ANGELES OFFICE
200 S. SPRING ST.

BUFF & BERGER

Mining Transits



With patent interchangeable auxiliary. Telescope for use on top or side in vertical sighting. Our friends are cautioned against infringements foreign or domestic as attempts have been made of late to mislead the public.

SEND FOR CATALOGUE.

11 Province Court, Boston, Mass.

Mines Examined

Processes Tested

HORACE F. BROWN, M. E.

PATENTEE OF

BROWN'S System of MECHANICAL ROASTING FURNACES, Complete Automatic Milling Processes, Etc.

1606-7 MANHATTAN BLD., CHICAGO

JOHN STEWART

MINING ENGINEER

Address:—Mining and Metallurgical Journal
LOS ANGELES, CAL.

Examines and Reports on Mineral Properties

Ores! Ores! Ores!!

Gold, Silver and Lead Ores and Concentrates

Purchased at Reduced Rates for Treatment.

Selby Smelting and Lead Co.

416 MONTGOMERY ST., San Francisco

Consign Shipments to Vallejo Junction, Cal.

W. O. ABBOTT, ASSAYER

ASSAYING IN ALL ITS BRANCHES
CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - ARIZONA

Spadone's Concentrator Belts

Patented



This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone Curved Edge. Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

Send us your order for Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING, RUBBER PACKING and LEATHER BELTING.

The Gutta Percha Rubber and Manufacturing Company,

30 and 32 FREMONT STREET,

SAN FRANCISCO, CAL.

MATHISON & CO.

29 LIBERTY ST.,
NEW YORK CITY

ANTIMONY

BUY

ANTIMONY ORES AND

CRUDE ANTIMONY

* WRITE FOR FULL PARTICULARS

Minerals Wanted

Ores, Crystallized Specimens, Loose and detached Crystals
Wanted in Quantity

If you have any Ores, Unidentified, write me.

ROY HOPPING,

6 and 7 DEY STREET,

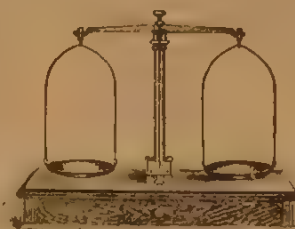
NEW YORK CITY



C. DUCOMMUN,

300-302 N. MAIN STREET,

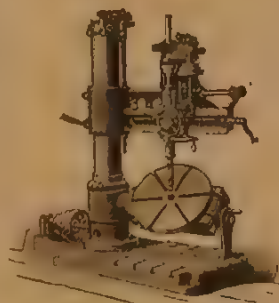
LOS ANGELES



Assayers Material Mine and Mill Supplies

Dixon's Black Lead Crucibles, Denver Fire Clay Crucibles, Muffles, Scorifiers, etc.; Quicksilver, Drill Steel, Retorts, Mortars, Gold Pans, Drilling Hammers, Drifting Picks, Horn Spoons and Shovels.

THE RADIAL DRILL



of the present is especially adapted to a wider range than ever before thought of, and in regard to efficiency and economy the

"BICKFORD"

Invites inspection as being in its present form the perfection of such Tools.

BICKFORD
DRILL & TOOL
COMPANY

Cincinnati, Ohio,
U. S. A.

HENSHAW, BULKLEY & CO., AGENTS - San Francisco, Cal.

WHITNEY COMPANY

Iron and Steel. Miners, Blacksmiths, Machinists Supplies

Agents for Arizona and New Mexico for Marsh Steam Pump. Agents Hercules High Explosives, Miner's Supplies by car load. Fairbanks-Morse Hoisting Machinery and Engines. Full line of Steam Fittings and ENGINEERS Supplies. A specialty made of Supplying the Mining Trade of the SOUTH-WEST

ALBUQUERQUE

*

*

*

NEW MEXICO

When Installing a Tramway Have the

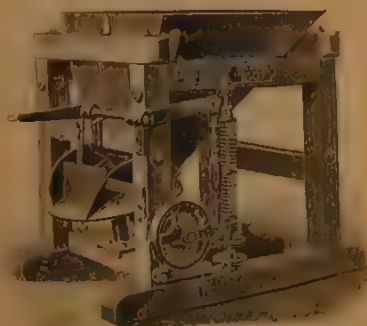
Finlayson Patent Automatic Wire Rope Tramway

The Only Automatic
(Double rope) Tramway Built

Economy
in Operation

Simplicity in
Construction

Easy
Running



CHALLENGE ECLIPSE ORE FEEDER
Will feed both wet and dry ores

THE COLORADO IRON WORKS COMPANY,

ESTABLISHED 1860

DENVER, COLORADO.

SOLE MANUFACTURERS

ENGINEERS AND MANUFACTURERS OF

Ore Milling
and Smelting
Equipments

CATALOGUE ON APPLICATION



BLACK HAWK ORE BREAKER

A. A. BAILEY

MANUFACTURER AND DEALER OF THE LEADING

Packings and Engineers Supplies

LUBRICATING OILS AND COMPOUNDS

Exclusive Manufacturer of the **UNSURPASSED****BAILEY**

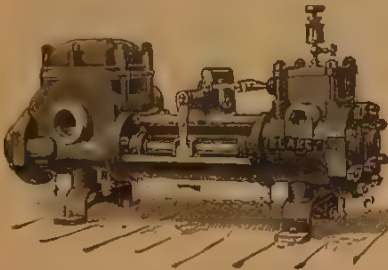
Anti-Friction Metal and all other Grades of Babbitt Metal

Sole Agents for Reliable Steam Pumps

300 South Los Angeles Street, - - - LOS ANGELES, CAL.

Geo. F. Blake Mfg. Co.

NEW YORK, N. Y.



Boiler Feed Pumps,
Tank or Light Service
Pumps,
Combined Air and Circu-
lating Pumps,
Drainage and Irrigating
Pumps,
Special Fire Pumps,
Independent Air Pumps
and Condensers

Water Works and Power Pumps.

Henshaw, Bulkey & Co., Agents. San Francisco, Cal.

"READY ROCK" ASPHALT ROOFING

* THE STANDARD ROOFING OF THE UNITED STATES

Absolutely the most durable, convenient and strongest roofing material made.

"Ready Rock" Asphalt Roofing Co.

1006 North Main Street,

Los Angeles, Cal.

TELEPHONE MAIN 1076

Why SEND YOUR MONEY EAST FOR

Shoes and Dies, Camp Tappets, Car Wheels, Shafting, Hangers,
Pulleys, Ore Cars and Iron and Brass Castings, when they can
be obtained for the same price and in less than half the time

AT THE

Albuquerque Foundry and Machine Works,

Repairing of Mill and Mining Machinery a Specialty. Albuquerque, New Mexico

F. A. A. WILLIAMS, Mines & MiningA free Milling Gold Property at a bargain
Correspondence Solicited

— TRINIDAD, COLORADO

ASSAYERS AND CHEMISTSWorking tests of Ores by all processes.
Samples by mail or express solicited**TREMAINE & FROELICH,**

132 Third St., PORTLAND, OREGON

N. D. BURLINGHAM, M. E.Practical Examinations of Mines
anywhere. Plans and estimates
for Mining Machinery on
short notice.FORTY YEARS EXPERIENCE IN MINING AND MILLING
316 W. FIRST STREET, LOS ANGELES.**CHICAGO SCHOOL OF ASSAYING,**

J. DUNRAVEN YOUNG, Director.
1750 MONADNOCK BLDG., CHICAGO, ILL.
Courses in Elem Chemistry, Chemical Analysis,
Fire Assaying of Gold, Silver, Copper and
Lead Ores, etc. Ore Testing, including MILL
Runs by Mercury, Cyanide and Chlorination
processes. Individual Instruction only. Open
evenings. Opportunity for Miners & Prospectors.

Harper & Reynolds Co.,*** MINING * SUPPLIES ***

— AGENTS FOR —

**Judson Dynamite and Powder Co., Galvanized Spiral
Pipe, Steel and Iron.**152-154 North Main Street,
151-152 North Los Angeles Street, } LOS ANGELES, CAL.California Bellows Manufacturing Co.
123 Beale St., San Francisco, Cal.

MANUFACTURERS OF

BLACKSMITH BELLOWES

And Bellows of Every Description

Write us for our new Catalogue

THE CHEAPEST PLACE ON EARTH

TO OUTFIT A MINE IS AT

The J. H. MONTGOMERY MACHINERY CO.,

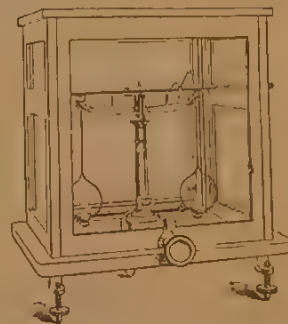
1220-22 Curtis St., Denver, Colo., U. S. A.

Just Listen—Reliable Common
Sense Steel Wire, price reduced
to \$100. Stamping Hoists, \$200 and
up; hand hoists \$50; steel ore
buckle to all prices; prospectors'
stamp mill \$200. A 6-
stamp mill, new,
850 lb. stamps,
high mor-
tars.

latest improved, only \$200. Ores tested and
amalgamation and concentration mills built to
fit the ore and guaranteed to save what we say.

Coal Mine equipments, Screens,
Jigs, Trimmings, Crushers, Chilian
Mills, Ore Sacks, etc. Cornish
Rolls, 12x20, weight 6,000 lbs.,
price \$350; Feeders, Rock Drills
and Compressors, Pumping
Tables, Chlorination Mills, etc. Blake Crush-

ers, 7x10, weight
8,100 lbs. only \$250.
Cyanide Mills.
Our patent
Turntable Car
has equal load
on each
wheel, wears
even, dumps au-
tomatically. Our 100
page catalogue with
hundreds of useful tables,
FREE. Best Machinery and
least money for it.

QUEEN NO. 4 ASSAY BALANCE

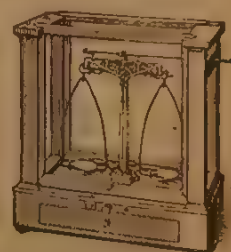
Aluminum Beams, Agate Knives and Planes
Sensitivity 1-50 mg. The Best Low-Price Assay
Balance on the Market. Send for Circular.

QUEEN & CO.,Optical and Scientific Instrument Works
1010 Chestnut Street,
N. Y. Office, 116 Fulton St. Philadelphia

ESTABLISHED IN 1840

HENRY TROEMNER,

710 Market St., Philadelphia, Pa.

**Assay Balances and Weights**In use in all the U. S. Assay Offices
in America

PRICE LIST ON APPLICATION.



Roller, Steel and Special Chains.

ELEVATORS**CONVEYORS**

FOR HANDLING MATERIAL OF ALL KINDS.



WIRE CABLE
CONVEYORS.
For long and
short distance
conveying

THE JEFFREY MFG. CO. 41 DEY STREET,
Columbus, Ohio. Send for Catalogue.

"HENDY" IMPROVED**Triple Discharge Two-Stamp**

— MILL —

Capacity six to ten tons per day
PRICE, \$450.00**JOSHUA HENDY MACHINE WORKS**

38 to 44 Fremont St., San Francisco, Cal.

ROGERS & BALDWIN,

MACHINE SHOPS

All kinds of repairing
for Engines, Boilers
and Machinery Riverside, Cal.**ANTIMONY.**

We buy Antimony Ore in any quan-
tity and pay prompt CASH for same.
Write us and let us know what you
have.

Chapman Smelting Works Co.,
(INCORPORATED)
224 Battery Street. San Francisco, Cal.

J. B. Pope

U. S. Mineral Surveyor,

SAN BERNARDINO, CAL.



Quartz Screens
A specialty. Round, slot or buried slot holes. Genuine Russia Iron, Homogeneous Steel, Cast Steel or American planished Iron, Zinc, Copper or Brass Screens for all purposes. CALIFORNIA PERFORATING SCREEN CO., 145-147 Beale St., S.F.

J. B. HAWLEY & CO.

Analytical Chemists and Assayers

Accurate Analysis of Ores, Water, Soils Etc. Samples by mail receive Prompt Attention.

132 New High Street, Los Angeles, Cal.
275 N. Spring Street

Pacific Coast and Mexican Agents



FOR

Keasby & Matteson's



Magnesia Sectional Steam Pipe and Boiler Covering

The only covering that water will not destroy. Indispensable in covering pipes conducting steam to pumps in mines.

ALL KINDS OF ASBESTOS GOODS

DE SOLLA DEUSSING COMPANY,

Send for Testimonials.

4 California Street, San Francisco, Cal.

EDWARD B. READ,

Engineers' Specialties, Cylinder and Machinery Oils, Cylinder Lubricators,

Lord's Boiler Compound, Cyclone Steam Flue Cleaner, Engine Compound Electric Spiral Packing, Shafting Compound, Crank Pin Grease, Wire Rope Grease, Extra Gear Grease, Belt Grease and Oil, Skin Grease, Elevator Grease, Crescent Flue Scraper, Oil Cups, Compound Cups, Dibble Lubricator, Packing and engineers' supplies.

CORUNDUM WHEELS.

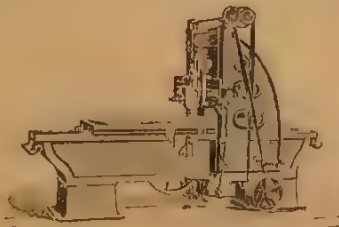
No. 12 First Street,

San Francisco, Cal.

NEW HAVEN MFG. COMPANY

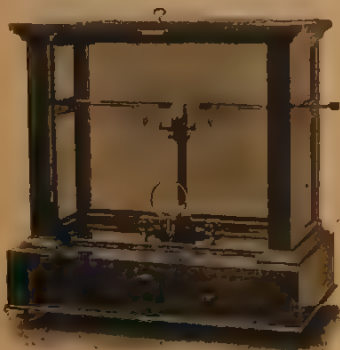
NEW HAVEN, CONN.

IRON WORKING TOOLS,



Engine Lathes, Pulley Turning Lathes, Iron Planers, Slotters, Upright Drilling Machines, Horizontal Drilling and Boring Machines, Etc.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.



SMITH & THOMPSON

Manufacturers of

Fine Assay Balances

Write for Catalogue

2219 Stout street

Denver, Colo.

Advertise in ...

... The Journal

The Giant Powder Company

+ CONSOLIDATED +

Principal Office: 430 California Street
SAN FRANCISCO, CAL.

P. J. NOLAN, General Agent for Mexico
Apartado 230 City of Mexico.

A. A. SPARKS,
Resident Agent Southern California.
Room 438 Bradbury Block, Los Angeles, Cal.

AGENTS

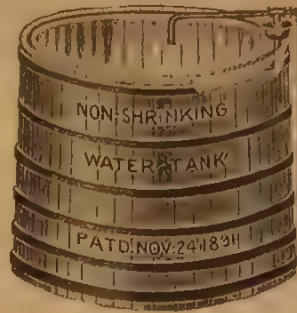
Roy & Tiltcomb, Nogales, Arizona
Samuel Hill, Prescott, Arizona
Kellner's Store, Phoenix, Arizona
Thomas Wilson, Tucson, Arizona

A. Calderon, Hermosillo, Mexico
G. Moller & Co., Guaymas, Mexico
Wohler Bartling & Co., Mazatlan, Mex.
Delius & Co., San Blas, Mexico

Julio Hilderbrand & Co., Durango, Mexico
Julio Hilderbrand & Co., Toluca, Mexico

J. P. De Fresno, Culiacan, Mexico
T. Robinson Bours, Alamos, Mexico

Manufactures Dynamite, Black Blasting and Sporting Powders.



TANKS

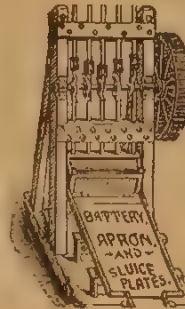
OF EVERY DESCRIPTION
FOR

Mines, Mills and Cyanide Plants
Patent Non-Shrinking Water Tanks

The only Tank that will stand the Desert and Hot Climate.
Write for Catalogue and Estimate on any kind of Tank Work.

Pacific Tank Co.

33 BEALE ST., SAN FRANCISCO
348 EAST 2d STREET, LOS ANGELES



To Gold Miners!

Silver Plated Copper AMALGAMATING PLATES

For Saving Gold In Quartz and Placer Mining.

EVERY DESCRIPTION OF MINING PLATES MADE.

Only Best Copper and Refined Silver Used. Old Mining Plates Replated. Twenty-six Medals Awarded. Gold, Silver, Nickel, Copper & Brass Plating.

Denniston's San Francisco Plating Works

653 and 655 Mission Street, San Francisco, Cal.

Telephone, Main 5931.

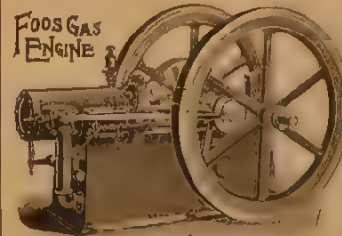
E. G. DENNISTON,

Proprietor

Send for Circular.

Foos Gasoline and Distillate Engine

The Best in the Market



Ten Hughes lately put in the Rand District operating Hoists, Mills and Pumps. We have sold 20 of these engines and we warrant their satisfactory. The Triumph Pump for deep wells throws a steady stream. No cranks or dead centers. The rods move vertically requiring less power than other pumps.

Underwriter Vehicles,
Machinery, Engines

S. W. LUITWEILER CO.

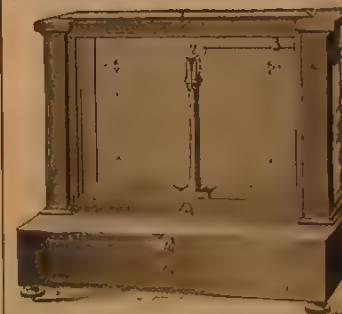
200-202 N. LOS ANGELES ST.
LOS ANGELES, CAL.

ESTABLISHED 1859

Herman Kohlbusch Sr.

59 Nassau Street,
New York, N. Y.

MANUFACTURER OF



Fine Balances and Weights

For every purpose where accuracy is required.

...

If you cannot obtain my goods from your supply house send direct to me for catalogue and prices.

THE WILSON

Forged High Grade Steel

Shoes and Dies

Guaranteed to Wear Longer and Prove Cheaper than any others.
Made by use of Special Appliances. Patented Aug. 16th, 1891.

Made only by

WESTERN FORGE AND ROLLING MILLS

St. Louis, Missouri

JOSHUA HENDY MACHINE WORKS

SOLE AGENTS

38 to 44 Fremont Street,

San Francisco, Cal.



The JACKSON Hand Power Rock DRILL

NO JAR

EASILY OPERATED

We also deal in General Mining Machinery and Supplies

The Jackson Drill and Manufacturing Co.
N. Y. OFFICE,
120 Liberty StreetExhibition Rooms,
1700 California St.,

DENVER, COLORADO

BOX 1352

Office
1757 Larimer St.

CABLE ADDRESS: "Jack Drill," New York, A. B. C. Code 4th Edition and Lieber.



The National Feed Water Heater

Highest Premium at World's Fair

800,000 HORSE POWER IN USE

SIMPLICITY
CHEAPNESS
RELIABILITY
EFFECTIVENESS

Henshay, Bulkley & Co.,

 Agents,
SAN FRANCISCO, CAL.

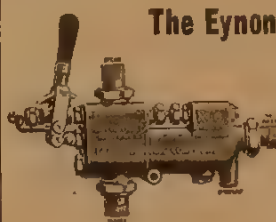
P. & B. PAINT

 FOR MINES, SMELTERS, CHLORINATION WORKS,
THE CYANIDE PROCESS.

 P. & B. Roofing put up in Rolls to lay 200 square feet, with Paint and Nails.
Absolutely Acid and Alkali Proof.

PARAFFINE PAINT CO., Manufacturers.

312-314 W. 5th St., Los Angeles



The Eynon-Korting Compound Injector

 The Best for
Quartz Mill
and Smelter
Boilers

 Brass, Bronze and Copper Castings of every description.
Send for Catalogue of the
Injectors, Condensers, Blowers, Ventilators, Blast Nozzles,
Syphons, Exhaustors, Etc.

 THE EYNON-EVANS MFG CO.,
15th and Clearfield Streets, PHILADELPHIA, PA.

E. C. CREEL, Presidente.

JUAN A. CREEL, Gerente

Compania Industrial Mexicana

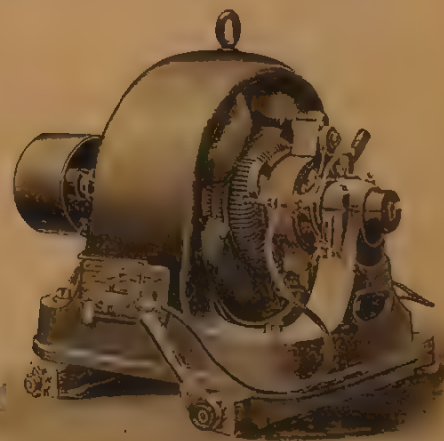
Ferreria
Fundicion de Fierro y Bronce

Fabricantes...

de toda clase de

**Maquinaria para minas y
Haciendas de Beneficio**

 Compania
Industrial
Mexicana

Quebradoras Maquinas de vapor.
Retortas, Ruedas Hidraulicas, Calderas
de todas clases, Maquinas de extraction. Car-
ros para mineral, Molinos Huntington. Bombas
Malacates de Vapor, panes de amalgamacion.
Concentradoras, compresores de aire. Lavaderos,
Haciendas de Lixiviacion; Hornos de chaqueta
["Water Jackets."]

**Dinamos, Motores y Material
Electrico.**

BARATURA y PRONTITUD.

Se envian circulares Pedido.

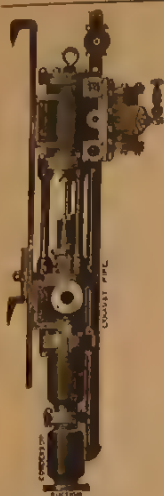
Para informes dirigirse al gerente,

Se solicita la correspondencia.

JUAN A. CREEL,

Chihuahua,

Mexico



W. T. CARRATT & CO. Brass & Machine Works.

MANUFACTURERS

HOOKER STEAM PUMPS,
MINERS' SINKING PUMPS,
TRIPLE PLUNGER PUMPS,
JACKHEAD MINING PUMPS,
CENTRIFUGAL PUMPS,
GONGS FOR MINE SIGNALS,
LUBRICATORS & OILERS,
SUCTION HOSE AND COUPLINGS,
HYDRAULIC PIPES,
IRON PIPE AND FITTINGS
BABBITT METALS,
PACKINGS
REPAIRING PROMPTLY ATTENDED TO.

138 to 148 Fremont Street,
SAN FRANCISCO, CAL.



MINERS' OUTFITS.



IRON MORTARS,
AMALGAM MORTARS,
GOLD WASH PANS,
MINERS' HORNS,
BATEAS, CRUCIBLES,
HORSE-SHOE MAGNETS
MAGNIFYING GLASSES
IRON RETORTS,
CHEMICALS, SCALES,
WEIGHTS, ETC.

Including a full as-
sortment of Mine and
Mill Supplies, Assay-
ers' Materials, Etc.

Sole Agents for the
Pacific Coast for the

W. S. TYLER WIRE WORKS CO.
Manufacturers of

Steel and Brass Wire Battery Screens
Agents for Baker & Adamson's Chemically
Pure Acids. A full stock always
on hand.

Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr.
1.20; Sulphuric Acid, sp. gr. 1.845.

JOHN TAYLOR & CO.
63 FIRST ST., SAN FRANCISCO
Prices on application.

The State Ore Sampling Co.

DENVER, COLORADO.

Gold, Silver, Lead and Copper Ores and Matte
sampled and marketed to the best advantage.
With modern mills and machinery our facilities
for sampling ores are the best.

Our long experience in the market enables us
to obtain the highest prices for all marketable
ore. Write for our "Reference Book." Send
analysis of your ore for prices and information.

BAILY & MONNIG, Managers.

Silver City Reduction Company

This plant has been purchased and will be
operated in the future by the Estate of the late
Senator George Hearst of California, under the
general management of D. B. G. Hette, Jr.

It is the intention of the present management
to largely increase the capacity of the plant and
equip it with every modern appliance for the
successful and cheap treatment of ores and con-
centrates.

Consignments and Correspondence Solicited.
Advances will be made on ores.

Silver City, Grant Co. New Mexico

RIVETED SHEET STEEL WATER PIPE
For Placers, Water Powers, Irrigation, Etc.
THE WEIGLE PIPE WORKS
2349 51 Larimer St. DENVER, COLO.

GOLDSMITH BROS.

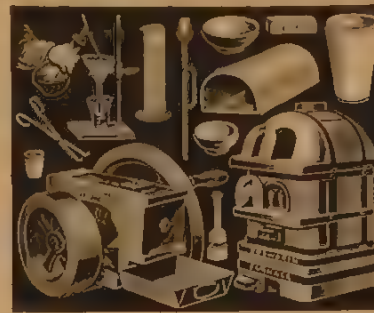


Refiners and Assayers

63 and 65 Washington Street,

Chicago, Illinois

Shipments of Gold and Silver Bullion solicited. We pay \$225 per ounce for gold, market
price for silver contained therein. No charge for separating ASSAYS of Ores and ANALYSES of
all kinds promptly made.



THE Denver Fire Clay Co

Assayers' and Chemists' Supplies

MANUFACTURERS OF

Crucibles, Scoriafiers & Muffles
And all other kinds of
Fire Clay Material.

SPECIALTIES—Strictly c. p. Acids
Test Lead, Bone Ash, Cyanide
Potash, Argol, Borax, Borax Glass
Iron Sulphides, Litharge, Soda
Mining Fluxes, etc.

Sole Agents for the
Ainsworth Balances

FACTORY:

3101-3141 Blake St., 1742-1746 Champa St., Denver, Col.

OFFICE:

Analytical Chemists and Assayers

Analysis made of ORES, Waters,
Chemicals, Clays, &c. Umpire
Work a Specialty

HARMON & MORRISON,
141 Chestnut Street, PHILADELPHIA, PA.

S. L. BURBRIDGE.

CONSULTING

MINING AND METALLURGICAL ENGINEER

105-106 BAILY BLOCK,

Mines examined and reported on,
SEATTLE, WASHINGTON

FAUTH & COMPANY.

(O. N. SARGENT),

Engineering and Mining Instruments,

WASHINGTON, D. C.

Attention is called to our newly improved
Mining Transit, with best Solar Attachment
and Vertical Sighting Telescope and Quick
Leveling Head.

ASSAYER and CHEMIST

Mark samples plainly, advise by letter
of full details, with charges enclosed.
Postage on ore one cent per ounce.

C. H. VOLL,

34 Roxwell Bldg.

SEATTLE, WASHINGTON

CLARENCE HERSEY, Assayer and Chemist,

(Established 1879)

LEADVILLE, COLORADO

Samples by Mail or Express Re-
ceive Prompt Attention

SPECIMEN ASSAY PRICES:

Gold silver and lead, \$1.00; any two of the
above, 75c; any one of above, 50c; copper analy-
sis, \$1; platinum, nickel or tin, \$5.00.
Write for full price list and mailing envelopes

This Cut Illustrates Our
4 H.P. to 8 H.P.

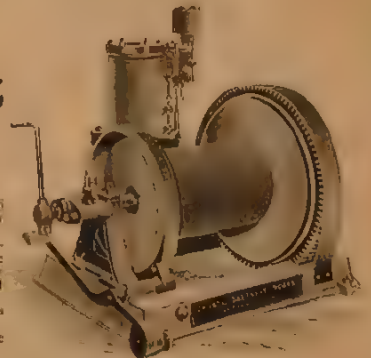
Hoisting Plant

We also build larger sizes to suit
the demands of our
customers.

The hoist illustrated is designed to lift 1000
pounds in less than a minute with the smaller
sized engine.

It is strong and exceedingly simple and durable,
being entirely under the control of the
operator by the use of a single hand lever for
hoisting, while the lowering is governed by a foot
lever and brake.

No better device has been designed for this
purpose.
For prices and further information address the
builders.



ORIENTAL GAS ENGINE CO.

105 Beale Street, San Francisco, Cal., U.S.A.

WHITE, ROGERS & COM'Y.

CONSTRUCTING ENGINEERS AND MILLWRIGHTS

306 PINE STREET, SAN FRANCISCO, CAL.

Sole Pacific Coast Agents and Builders of the Celebrated

WILFLEY CONCENTRATOR.

Price \$450 f. o. b. San Francisco

One of these Machines will take the place of TWO or THREE Belt Concentrators of any make and do very much better work.



WILFLEY CONCENTRATOR

We furnish superior Machinery and erect Stamp Mills, Hoisting and Pumping Works
operated by Steam or Water Motors. Complete Concentrating and Smelting Plants for the
concentration and recovery of gold, silver, copper and lead. Improved Power Drills and Air
Compressors, Wire Rope Tramways, etc.

The Wilfley Table is fully covered by U. S. Patents Nos. 880,338 and 890,673.

Infringements will be prosecuted to the full extent of the law.

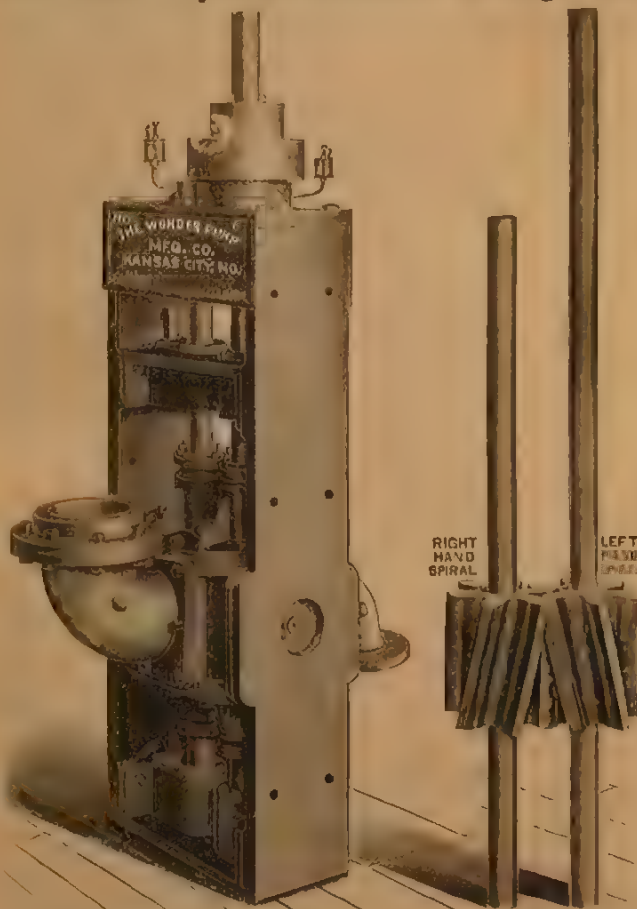
These Machines are Kept in Stock Ready for Immediate Shipment

Chicago and Aurora Smelting and Refining Co.**Lead, Silver and Gold Ores**Purchasers of **Manufacturers of BLUE VITRIOL**
Works at Leadville, Colo., Aurora, Ill., and Chicago, Ill.
General Office, Woman's Temple, Chicago, IllinoisWhatever is Popular Deserves Attention. *That's why.*

UNQUESTIONABLY THE MOST POPULAR FRICTION HOIST IN THE MARKET IS THE

Bolthoff Lightning Quadruple Friction HoistRequires less power to apply and gives better contact for friction surfaces than the double friction types.
By carrying the brake band between the frictions the strain is reduced to a minimum.

COMPLETE HOISTING OUTFITS CARRIED IN STOCK

HENDRIE & BOLTHOFF M'F'G & SUPPLY CO.,**Denver, Colorado****The New Improved Wonder Mining Pump**

The only Mining Pump made that will work from pump to pump on the one discharge pipe, doing away with all reservoirs. Write

The Wonder Pump Manufacturing Co.,

ARMOUR BLDG., KANSAS CITY, MO., for catalogue

Stockton Assay OfficeGold and Silver Assays, \$2.00.
Plve Assays and over, \$1.60 each

329 E. Magnolia street, Stockton, Cal.

Send Samples and remittances
by Express or mail.**KLONDIKE OUTFITS**

I am prepared to contract for the complete outfitting of Parties going into the Klondike from Vancouver, B. C., the best place from which to outfit and sail.

Direct Steamers. No duty to pay on goods.
Write or wire for full particulars
PERCY W. CHARLSON, General Broker
VANCOUVER, B. C. P. O. Box, 187
CABLE ADDRESS: "CHALCOUVER"**EAGLE PACKING**Also White Eagle, Graphite, Hydraulic, Nitr and other brands for all purposes for which packing is used. Write for samples and prices. Manufactured by **James Glandling Co.,**
1927 North 6th St., PHILADELPHIA, PA.

Mathematical, Scientific and Drawing Instruments



6 E. Cor. 7th & Chestnut Sts., Philadelphia, Pa.

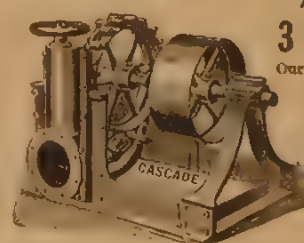
Boxwood Scales. All kinds of repairing promptly executed.
GUIDO FERRARI**GOLD and SILVER** REFINERS & ASSAYERSBullion Bought. No charges for parting. Gold \$30.00 per oz., Silver and Platinum at market prices. Assaying in all branches. Working tests made by all processes. Wastes and Concentrates bought. Prompt attention. Best Services.
..... Your Trade Solicited**PENN SMELTING AND REFINING WORKS, 901-903 Filbert St., PHILADELPHIA, PA.****Turbine AND Cascade****WATER WHEEL**

Adapted to all Heads from

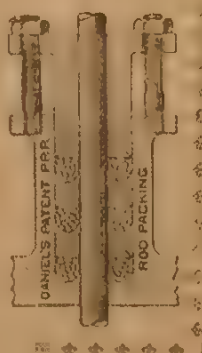
3 Feet to 2000 Feet

Our experience of 33 YEARS building Water Wheels and all kinds of water power equipment of Water Power Plants. We guarantee satisfaction.

Send for a Pamphlet of either Wheel and write full particulars.

James Leffel & Co.
SPRINGFIELD, OHIO, U.S.A.

\$35,000,000 in Dividends paid out by Utah Mines up to date.

UTAH MINING STOCKSWeekly Market Report on application. Quotations by wire or mail.
Reference: Any Bank in Salt Lake City.**P. J. CONWAY & CO.,****SALT LAKE CITY, UTAH****DANIEL'S PATENT P.P.P. Diagonal Rod Packing**

For Steam, Water, Oil, Air, Ammonia, Etc.

SAVES LABOR
SAVES POWER
SAVES MONEY

It Represents Highest Class Materials and Greatest Service.

**NO PAY IF NOT AS CLAIMED**

SLIDING WEDGES, COMPENSATING FOR WEAR. OIL CUSHION TO ENAMEL AND LUBRICATE THE ROD.

Best Packing for use in MILLS, MINES and SMELTERS

MANUFACTURED ONLY BY

C. A. DANIEL, Philadelphia, Pa.

To insure getting the Genuine see that Every Box and Wrapper has our Trade Mark.

THOMAS PRICE & SON**Analytical Metallurgical and Physical Testing Laboratory**

524 SACRAMENTO STREET, SAN FRANCISCO, CAL.

N. OHLANDT & CO.

MANUFACTURERS OF

Best Quality of BONE ASH for Assayers.

Our Goods are used in all parts of the United States and Mexico.

EXTRA No. 1 and No. 2

CORRESPONDENCE SOLICITED

327 MARKET STREET, SAN FRANCISCO, CAL.

OTTO HECKELMANN

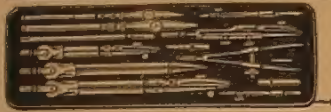
FERDINAND McCANN

ASSAYERS AND CHEMISTS**Heckelmann & McCann + + Bullion Dealers**

Cash paid for all kinds of Gold, Silver and Ores. All assays and Chemical Analysis at Mexican Silver Rates, 50 per cent. Less than American Price.

PUENTE DE SAN FRANCISCO, No. 6

CITY OF MEXICO

**Engineers' and Draughtsman's Supplies**

Sole agents for Riefler's round system drawing instruments and Albert Ott's Planimeters, Pantographs and other instruments of precision. Levels and transits of superior make.

P. WEBER & CO. PHILADELPHIA

1125 CHRIST ST.,

Subscribe for



the Journal

**Pueblo Foundry,
Machine Shops and
Boiler Works**

— MANUFACTURERS OF —

Wrought and Cast Iron. Water Jacket Furnaces, MINING and Irrigation Pumps, Engines, Boilers, Hoisters, Tanks, Derricks, MINING MACHINERY, Brass Castings; light and heavy Forging. New and Second-hand Engines. Boilers and pumps always on hand.

PUEBLO, COLORADO.

The Machinery and Electrical Company,**Machinery and Supplies**

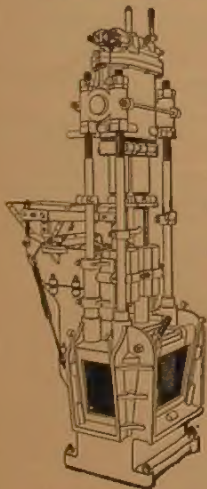
MINING HOISTS, WHIMS, ORE BUCKETS,
Bates Corliss Engines, Snow Steam Pumps
OIL CITY BOILERS AND ENGINES,
Hercules Gas Engines, Lawrence Centrifugal Pumps
GATES IRON WORKS MINING MACHINERY
Tremaine Steam Stamp Mills
Electric Lighting, Railway and Transmission Apparatus
Washburn & Moen Mfg. Co's Wires and Cables

Also Dealers and Jobbers in

Shafting, Belting, Dodge Wood Pulleys, Hangers,
Boxes, Etc.

WRITE FOR PRICES

351 & 353 N. Main St. Los Angeles, Cal.



TREMACHINE STEAM STAMP

EASTERN PRICES BEATENIMPROVED FACILITIES, FINEST WORK
LOWEST PRICES**PERFORATED SHEET METALS**

For Flour and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Revolving and Shot Screens, Stamp Batteries, Iron, Steel, Russia Iron, American Planish, Zinc, Copper and Brass Screens for all uses. Inventor and Manufacturer of the celebrated Slot Buried and Diagonal Slot punched Screens.

MINING SCREENS A SPECIALTY

Mill owners using screens extensively, can contract for large supplies at favorable rates J. W.

QUICK is the only competent and successful manufacturer of Screens on the Coast, having furnished Screens

to the Principal Mills of

California, Nevada, Alaska, Mexico, Central America, Australia and British Possessions.

San Francisco Pioneer Screen Works

(Established 1860)

221 and 223 FIRST STREET, SAN FRANCISCO.

J. W. QUICK, Prop.

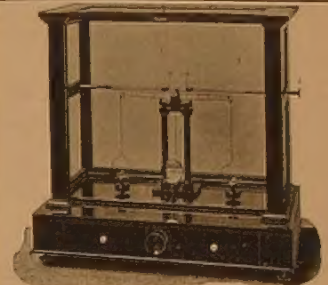


MANUFACTURER AND DEALER IN

Perforated Sheet Metals,

Steel, Russian Iron, American Planished
Zinc, Brass and Copper.

Mining Screens of Every Description
SAN FRANCISCO, CAL.

**AINSWORTH NO. 043**

Sensibility.....1-100 Milligramme
Ten inch beam on which you can weigh from 1-100 to 1 Milligramme with a one milligramme rider.

Complete catalogue of Assayers' and Chemists, supplies, including this and other balances, mailed upon application. SELLING AGENTS,

The Denver Fire Clay Co.,

1742-1746 Champa St., Denver, Colo.
P. O. BOX, 1540

The Kootenai Gold Mining District

of British Columbia, which of late has been attracting considerable attention, is best reached by the Oregon Railroad and Navigation Co. The fact has recently been brought out that the Kootenai district contains within its borders more *High Grade Silver and Lead Mines* than any other part of the world. The recent discoveries of *Rich Gold Lodes* makes it the most attractive country for the *Capitalist Miner and Prospector* to visit in search of mines.

The Oregon Railroad and Navigation Co.

Dispatch Fast Steamers every Four Days

from San Francisco connecting at Portland, Oregon with their rail line for all points in this famous district. For full particulars address,

E. C. WARD, GENERAL AGENT.

SAN FRANCISCO, CAL.

630 Market Street,

**HALLIDIE
PATENT
ROPEWAY**

— FOR THE —

Transportation of Ore, Fuel and other material, has been erected by us all over the country and is the most economical and efficient method known. Nothing to get out of order; has always given satisfaction.

California Wire Works

[LICENCED]

Office, 330 Market St. San Francisco, Cal.



Mention the Journal

WIRE TRAMWAYS

Ropeways,

* Incline Planes,
and Railways.

Hoisting Apparatus, Patent Grip Pulleys, Transmission of Power by Wire Ropes; 25 years experience; Send for Ropeway Pamphlet.

Pacific Coast Agents for

The Calhoun Excavator

A combined power Shovel and Cableway for excavating and handling earth or loose rock.

SEND FOR DESCRIPTIVE CIRCULARS

The Little Alaska Gold Washer, T. J. BURKE, 329 E. 2d St. LOS ANGELES, CAL.



Designed and manufactured by
T. J. BURKE, 329 E. 2d St.
LOS ANGELES, CAL.

Applications for Patents Pending in the United States, Canada and Mexico. Filed in the Patent Office at Washington, February 20, 1898.

No Screens, nor Grizzlies; handles all material from the grass roots to hard rock; A perfect miners device; Works under water or on the dry bar. Weight 7 pounds; can be taken apart and packed in a grip sack.

W. A. RUSSELL,
Special Agent for the State
of California
441 SOUTH BROADWAY,
LOS ANGELES, CAL.



For full particulars as to Foreign territory

Address

T. J. BURKE,

329 E. 2d Street

Los Angeles, Cal

PATENTS!

TOWNSEND BROTHERS
SOLICITORS OF PATENTS

Patents on Inventions secured in all countries. Copyrights, Trade Marks and Labels.
Office, 9, Downey Block,
Telephone 347. Los Angeles, Cal.

TIMOTHY W. SPRAGUE, S. B.

WITH

CHARLES HENRY DAVIS, C. E.
CONSULTING ENGINEERS

99 CEDAR ST., NEW YORK 4 STATE ST., BOSTON
DREXEL BLDG., PHILADELPHIA
Electric Transmission of Power and Mine
Equipments

E. C. WOODWARD,

Assayer and Chemist

Telephone 315

24 E. Kiowa St., Colo. Springs, Colo.

KLONDIKE

WANTED—Men and Women to
know the cheapest, easiest and
best route to KLONDIKE. How
to go and make expenses on
the way. Circular free for stamp.
Agents wanted for steamer line.
G. W. McCOY,
10914 First St., Portland, Ore.

THEODOR LEXOW

195 Broadway New York

Importers of

CARBONS

— FOR —

DIAMOND DRILLS and all Mechanical
Purposes

Henry Demmert

I. C. YAWGER,

SUCCESSOR TO
VICTOR BISHOP & CO.



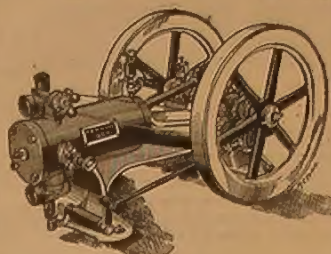
21 MAIDEN LANE NEW YORK

**DENVER PUBLIC ---
SAMPLING WORKS,**

M. E. SMITH, PRESIDENT.

ORES SOLD ON THE
PUBLIC MARKET. Denver, Colo.

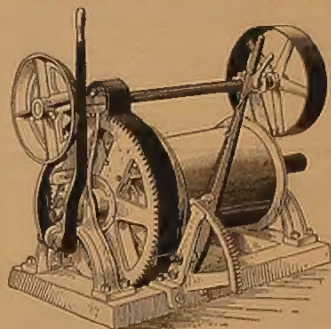
PERKINS Gas Engine



MODEL OF 1897

Composed of Sixteen parts, constructed so plain and substantial that it may be taken to the desert mines without fear of unreliable operations, uses Storage and Dynamo for sparking, the cooling jacket water is used over. Uses about 8-10 of a gallon of gasoline for each horse power for a twelve-hour run. Ten horse power engine weighs 2250 lbs. boxed for shipment.

Perkins Power Hoist



Is light and portable weighing 1050 lbs., heaviest piece weighs 150 lbs., capacity 1000 lbs. one hundred foot per minute will lift 400 feet. A Safety latch follows every foot of the lift, guaranteeing absolute safety.

PRICE \$125.00

For full particulars, apply to

Perkins Pump and Engine Co.

1023 N. Los Angeles St., Los Angeles

L. J. Lassell,

ASSAYER & CHEMIST

All Orders by mail promptly attended to and accuracy guaranteed. Prices on application.

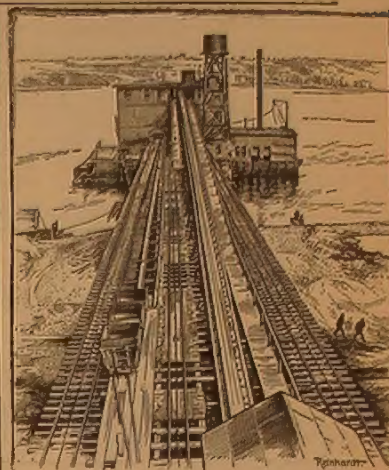
KINGMAN. - - - ARIZONA

SIMONDS & WAINWRIGHT,

Chemical and Mining Engineers and Analysts

Working tests of Ores by all Processes. Experimental Work on Chemical and Metallurgical Processes. Instructions in Assaying and Chemistry.

No. 20 Platt Street New York



FOR conveying Ore, Coal, Slag and Matte. Send full particulars of your wants in writing for prices.

Robins Conveying Belt Co.,
147-149 CEDAR STREET, NEW YORK

THOMAS J. DEE & CO.

Gold and Silver Refiners and Assayers

67 and 69 Washington St.,

Bullion Bought and Sold CHICAGO, ILL.

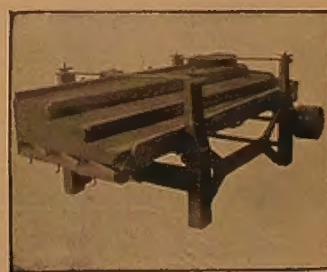
Sterne Bros.,

MACHINISTS AND
FOUNDERS

Mining Machinery, Engines, Boilers and
Pumps.....

Repairing Promptly Done.

SAN DIEGO, CAL.



The Bartlett Concentrating Table

Capacity to 30 tons daily; size 4x8 feet; weight 800 lbs. Clean separation of all minerals without sizing. Price \$250. Send for description.

American Zinc Lead Co.,
CANON CITY, COLO.

Subscribe for :::

::: The Journal

Miners Attention!

We Sell Powder, Caps, and Fuse, Mining Machinery, Belting, Asbestos Goods, packing of all kinds, Picks and Shovels, Iron and Steel; Iron Wheelbarrows, Ore Sacks, Tents, Portable Forges and General Mining Supplies. Agency Truax Mfg. Co and Studabaker Wagons.

WILCOX & ROSE CO., San Bernardino, Cal.

HOME MANUFACTURE
FOWLER'S

Fossil Asbestos Manufacturing Co.,
Sectional Removable Covering for
Steam Boilers, Pipes, etc.
As a Non-Conductor, Unsurpassed
Absolutely Fire Proof

G. C. FOWLER, 856-58 Howard Street,
San Francisco, Cal.



HOFF ASBESTOS MFG. CO., Bryson Block.
Los Angeles, Cal., Agent for Southern Cal.

H. P. G. COATES,
MINING AND DIVIDEND PAYING STOCKS,

Reliable Information on Application

SALT LAKE CITY, UTAH

FULTON ENGINE WORKS

Mining, Milling & Smelting Machinery

Estimates Furnished on all Classes of Mining Work

P. O. Box 296, STATION "C"

LOS ANGELES, CALIFORNIA

Mexican, American and Foreign Patents,

TRADEMARKS, ETC.

Reports on Mining and Other Properties.
Proprietors of *Weekly Anglo-American*, a first-class Advertising Medium.
Established 8 Years.

C. H. M. y Agramonte,

P. O. Box 388. Cable Address, "Agra"

CITY OF MEXICO, MEXICO

THE PUEBLO Smelting and Refining Company,

PUEBLO, COLORADO.

BUYERS OF
Gold, Silver, Lead and Copper Ores,
Copper Matte and Bullion.

Refiners of Gold, Silver, Lead and Copper.

Manufacturers of Bar and Pig Lead, Lead Pipe, Antimonial Lead, Copper Ingots,
Granulated Test Leads and Litharge.

Pays Highest Prices for all classes of Ores.

Especial Attention to Sampling by most Approved Processes.

Quick Returns on all Consignments.



CHAS. B. BOOTHE & CO.

MINING AND MILLING MACHINERY AND SUPPLIES,

Hoists, Horse Whims, Buckets, Wire Rope, Ore Cars

129 SOUTH LOS ANGELES STREET,

LOS ANGELES, CAL

FRANK H. HOWE,

MECHANICAL ENGINEER

Boilers, Engines, Pumps, Complete Steam and Oil Burying Plants

Mill and Mining Machinery

203 North Main Street, Los Angeles, Cal.

RISDON IRON WORKS,

SAN FRANCISCO, CALIFORNIA

Cable Risdon's, Code—A. B. C. & Leibers

MANUFACTURERS OF

GOLD DREDGING MACHINERY AND COMPLETE EQUIPMENT for Placer Mines, OUR SPECIALTY.

We build Gold Dredges Complete in Running Order to handle 2,500 cubic yards per day at a cost of 3 cents per cubic yard.

We excavate 50 feet below water, 20 feet above water and handle boulders up to one ton weight. Send for Dredging Catalogues Nos. 15 and 16.

We also build all kinds of Mining, Milling Concentrating, Pumping, Air Compressing, Hydraulic, Water Wheel and Hoisting Machinery.

EVANS' HYDRAULIC GRAVEL ELEVATORS.

We publish 16 Catalogues. Write for one in the line you are interested in.



The Mining & Metallurgical Journal



Has its Offices | STIMSON BLOCK, LOS ANGELES, CAL., and
64-65 MERCHANTS' EXCHANGE, SAN FRANCISCO, CAL.

Write for Advertising Rates

Do you Want **MINING AND MILLING MACHINERY** and do you want to get it **QUICKLY**

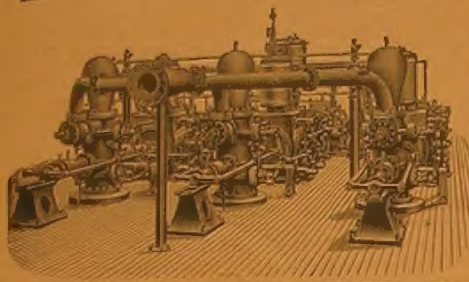
IF YOU DO, ADDRESS

Fraser & Chalmers, 133 FULTON STREET, CHICAGO

whose works are exclusively devoted to and adapted for the manufacture of Mining and Ore Reducing Machinery.
During the month of January, 1898, Fraser and Chalmers' Chicago Works received orders for Mills amounting to a total of

Eight Hundred and Fifteen [815] Stamps

and it is significant of their resources that even with this great amount of work in hand, they are still in position to contract for additional work for which **QUICK SHIPMENT** can be made.



JOSHUA HENDY MACHINE WORKS, Nos. 38 to 44 Fremont St. SAN FRANCISCO, CAL.

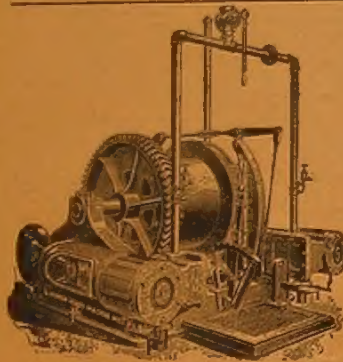
Manufacturers of and Dealers in

The Latest Improved

Quartz Milling, Pumping, Hoisting and Smelting Plants, Air Compressors and Rock Drills.

**"HENDY" IMPROVED "TRIPLE-DISCHARGE" TWO-STAMP QUARTZ MILLS
Boilers, Engines & Pumps of all capacities**

PLANS, SPECIFICATIONS and ESTIMATES OF COST SUBMITTED and CONTRACTS ENTERED INTO FOR FURNISHING and ERECTING MINING and MILLING PLANTS for all conditions of Use.



DOUBLE CYLINDER HOISTING ENGINE

BAKER IRON WORKS LOS ANGELES, CALIFORNIA

Manufacturers of

Mining and Milling Machinery, Atlas Engines and Boilers, Worthington Steam Pumps

Water Works Machinery A SPECIALTY

MINING ENGINES
Double AND Single Drum

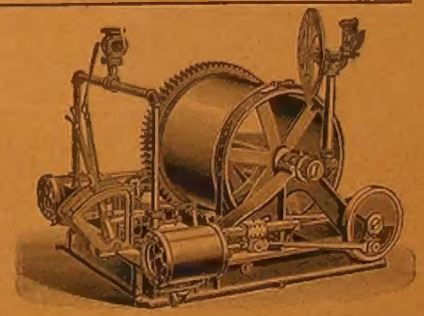
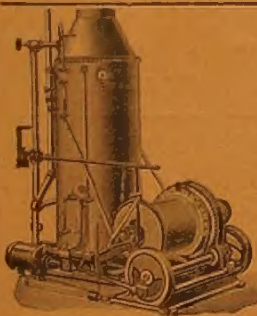
— ALSO —

Hoisting Engines and Electric Hoists for Every Known use

LAMBERT HOISTING ENGINE CO.

SEND FOR OUR NEW CATALOGUE R

125 POINIER STREET, NEWARK, N. J.



Mining Timbers and Construction Lumber

(California Long Leaf Yellow Pine Lumber)

Prices given for delivery to any point in Mexico by Rail through Porfirio Diaz, Nuevo Laredo or Paso del Norte, and by Vessel through Gulf Ports of Tampico and Vera Cruz.

Bradley-Ramsay Lumber Co.

LOUISIANA, U. S. A.

ADDRESS INQUIRIES FOR PRICES TO

R. N. WATSON, AGENT.

APARTADO NO. 118 MONTERREY, N. L. MEXICO

PARKE & LACY COMPANY
21 and 23 Fremont St., San Francisco, Cal.

MINING MACHINERY

SOLE AGENTS FOR
THE INGERSOLL-SERGEANT AIR COMPRESSORS AND ROCK DRILLS.

SOLE LICENSEE FOR THE MANUFACTURE AND SALE OF

THE ROPP STRAIGHT LINE FURNACE, For Roasting, Chlorinating and Desulphurizing Ores.
WE CARRY IN STOCK

Horizontal, Vertical and Portable Engines and Boilers. Rock Breakers, Cornish Rolls, Pulverizers, Concentrators, Ore Feeders. Hoisting Engines, Horse Power Hoisting Whims, Water Wheels, Steam Pumps, Ore Cars, Wire Rope, Ore Buckets, Water Buckets, Skips. Blowers and Exhaust Fans, Shafting and Pulleys, Belting, Oils and Mine Supplies. **Manganese Steel Shoes and Dies**

Estimates Furnished for Complete Plants for Hoisting Works, Smelters, Concentrating and Stamp Mills.

